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Medical Compend
FOR COMMANDERS
OF NAVAL VESSELS

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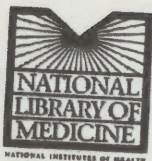
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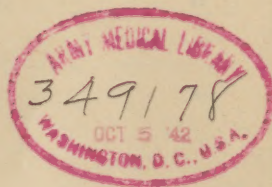
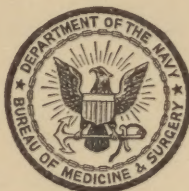
MEDICAL COMPEND

For

Commanding Officers of Naval Vessels to
Which no Member of the Medical Department
of the United States Navy Is Attached

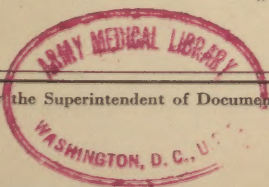
To accompany Medicine Box

PUBLISHED BY THE
BUREAU OF MEDICINE AND SURGERY
UNDER THE AUTHORITY OF THE
SECRETARY OF THE NAVY



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MEDICAL COMPEND

U. S. Navy

U. S. Navy

U. S. Navy

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BUREAU OF MEDICINE AND SURGERY,
NAVY DEPARTMENT,

Washington, D. C., July 1, 1941.

This MEDICAL COMPEND for commanding officers of naval vessels to which no member of the Medical Department of the United States Navy is attached, is published for their aid in the knowledge and use of the contents of the Medicine Box, United States Navy, as well as to be a general guide in the preservation of the health of the personnel under their command.

ROSS T McINTIRE,
Surgeon General, United States Navy.



U. S. Navy

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Chapter I

MEDICAL SUPPLIES

INTRODUCTION

This MEDICAL COMPEND, which accompanies the medicine box, is published primarily for the use of commanding officers of naval vessels to which no representative of the medical department is attached. In its preparation, an endeavor has been made to cover, in nontechnical language, the recognition and emergency treatment of those injuries and diseases commonly met with on board ship, as well as to provide directions for the management of quarantinable diseases and those cases beyond the ability of the ship's force to handle.

It is not intended that use of these instructions shall replace the services of a medical officer or civilian doctor whenever one can be contacted, nor take the place of hospitalization whenever or wherever such facilities are available. On the contrary, it is desired that commanding officers of naval vessels to which no member of the medical department of the Navy is attached, consult freely with medical and dental officers of the Navy, whenever opportunity offers, both ashore and afloat, regarding the care and treatment of the sick, as well as the general health of the crew and the sanitation of the ship. The medical and dental officer of a yard or station will be found at the dispensary, where, with the approval of the commandant, assistance and advice in the treatment and care of the sick may be received.

So far as possible the treatment outlined in this compend has been restricted to the employment of those agencies supplied in the medicine box or which may be obtained in the customary ship's stores. Suggestions as to any special agencies which are mandatory, and which should be obtained ashore at the earliest opportunity, are so indicated.

In addition to first-aid measures and the treatment of special diseases, there have been included chapters on hospitalization, preventive medicine, personal hygiene, quarantine and bills of health, and the disinfection and fumigation of ships, as well as the action to be taken in cases of death which may occur on board. At the end of the volume is a glossary containing some of the terms used in the text which will aid in interpreting the instructions given.

The outfits of medicines and medical supplies furnished consist, as listed, of either (a) the *Medicine Box*, Navy standard, or (b) the *Medical Boat Box*, Navy standard. The *Supplemental Medicine Box*, containing additional medical supplies in an ordinary packing case, is obtainable on requisition as needed.

Medical stores should be obtained in advance of actual need. They may be requisitioned separately by items or in the form of the *Supplemental Medicine Box*, complete, as listed. Certain items have been designated as *deteriorative*, such as rubber goods, etc., and these should be checked occasionally and replenished when unserviceable.

Medical supplies may be procured, as required, on the Medical Supply Depot Requisition and Invoice (NMS Form 4). Requisitions, when approved by the Bureau, will be filled by the naval medical supply depot most convenient to the ship; that is, if in Atlantic waters, by the depot in Brooklyn, N. Y., and if in Pacific waters, by the depot at Mare Island, Calif.

A supply of the requisition forms may be obtained from any supply depot, but if this form is not available on board the ship, a request for additional supplies may be made by letter addressed to the Bureau of Medicine and Surgery. Requisitions should be restricted to the items listed and should correspond in amounts with the packages as indicated.

Advantage should be taken of opportunities when in the vicinity of a naval medical supply depot, or when at navy yards or in dry-dock, to replenish the stock of medicines and medical supplies, but if the need is urgent the stock may be replenished from the medical stores of any yard, station, or other ship.



The Medicine Box, United States Navy. Plywood case and contents shown.



The Medicine Box, United States Navy. Illustration shows stowing of contents of Box. Shelves are detachable.



CONTENTS OF MEDICINE BOXES

THE MEDICINE BOX

(CASE, TABLETS)

| | | |
|---|--------|---|
| Alkaline and Aromatic (<i>Seiler</i>) | bottle | 1 |
| Aspirin (Acetylsalicylic acid) 5 grains | do | 1 |
| Azochloramid saline mixture tablets | do | 1 |
| Bismuth Subnitrate (powdered) | do | 1 |
| Borax (powdered) | do | 1 |
| Brown Mixture, 1 dram | do | 1 |
| Calomel, $\frac{1}{2}$ grain | do | 1 |
| Cascara Sagrada, 4 grains | do | 1 |
| Cathartic, vegetable | do | 1 |
| Coryza | do | 1 |
| Dover's Powders, 5 grains | do | 1 |
| Iron, Quinine, Arsenic, and Strychnine | do | 1 |
| Phenacetin, 5 grains | do | 1 |
| Phenobarbital, $1\frac{1}{2}$ grains | do | 1 |
| Quinine Sulfate, 3 grains | do | 1 |
| Soda Mint, 5 grains | do | 1 |
| Sodium Salicylate, 5 grains | do | 1 |
| Case, Tablets, U. S. N., empty | | 1 |

(MEDICINES, DRESSINGS, ETC.)

| | | |
|--|--------|---|
| Adhesive Plaster, 2 inches by 5 yards (<i>deteriorative</i>) | spool | 1 |
| Bag, hot water (<i>deteriorative</i>) | | 1 |
| Bag, ice (<i>deteriorative</i>) | | 1 |
| Bandage, gauze, 1 inch | dozen | 1 |
| Bandage, gauze, 2 inch | do | 2 |
| Bandage, gauze, 3 inch | do | 1 |
| Bandage, suspensory | | 2 |
| Basin, dressing | | 1 |
| Box medicine, empty | | 1 |
| Castor Oil | tin | 1 |
| Catheter, soft rubber, No. 10 F (<i>deteriorative</i>) | | 1 |
| Catheter, soft rubber, No. 12 F (<i>deteriorative</i>) | | 1 |
| Catheter, soft rubber, No. 14 F (<i>deteriorative</i>) | | 1 |
| Catheter, soft rubber, No. 16 F (<i>deteriorative</i>) | | 1 |
| Catheter, soft rubber, No. 18 F (<i>deteriorative</i>) | | 1 |
| Catheter, soft rubber, No. 20 F (<i>deteriorative</i>) | | 1 |
| Collodion, flexible | bottle | 1 |
| Colloidal Silver (argyrol) | do | 1 |
| Cotton, absorbent | roll | 1 |
| Dentalone | bottle | 1 |
| Epsom salt | tin | 1 |
| Eye Bath | | 2 |

THE MEDICINE BOX—Continued

(MEDICINES, DRESSINGS, ETC.)—Continued

| | |
|--|-----------|
| First-aid Packet..... | 6 |
| Forceps, hemostatic..... | 2 |
| Formaldehyde Solution..... | bottle 1 |
| Fountain Syringe (<i>deteriorative</i>)..... | 1 |
| Gauze, plain, absorbent..... | roll 1 |
| Iodine Tincture, 3 vials in package..... | package 2 |
| Lint, absorbent..... | roll 1 |
| Medicine Glass..... | 2 |
| Muslin..... | yard 5 |
| Ointment, Boric Acid..... | tube 2 |
| Ointment, Sulfur..... | jar 1 |
| Ointment, Yellow Oxide of Mercury..... | tube 3 |
| Ointment, Zinc Oxide..... | jar 1 |
| Pencil, hair..... | 2 |
| Pins, Scissors, and Dressing Forceps (set, in case)..... | set 1 |
| Prophylactic Tubes..... | tube 100 |
| Soap Liniment..... | bottle 1 |
| Soda Bicarbonate..... | carton 1 |
| Spatula, 3 inch..... | 1 |
| Spirit of Ammonia, aromatic..... | bottle 1 |
| Suture, surgical gut, untreated, boilable, No. 2, threaded in needle..... | tube 6 |
| Suture, surgical gut, mild treatment, boilable, No. 2, threaded in needle..... | tube 6 |
| Syringe, penis, rubber (<i>deteriorative</i>)..... | 2 |
| Tannic Acid Jelly..... | tube 4 |
| Thermometer, clinical..... | 2 |
| Tourniquet, instant, (rubber), (<i>deteriorative</i>)..... | 2 |
| Vaseline..... | tin 1 |
| Wire Mesh (for splints)..... | piece 3 |
| Medical Compend..... | book 1 |

THE SUPPLEMENTAL MEDICINE BOX

(TABLETS)

| | |
|--|----------|
| Alkaline and Aromatic (<i>Seiler</i>)..... | bottle 1 |
| Aspirin, (Acetylsalicylic acid), 5 grains..... | do 1 |
| Brown Mixture, 1 dram..... | do 2 |
| Cascara Sagrada, 5 grains..... | do 1 |
| Cathartic, vegetable..... | do 1 |
| Phenacetin, 5 grains..... | do 1 |
| Quinine Sulfate, 3 grains..... | do 3 |
| Sodium Salicylate, 5 grains..... | do 1 |
| Sulfadiazine..... | |

(MEDICINES, DRESSINGS, ETC.)

| | |
|--|---------|
| Adhesive Plaster, 2 inches by 5 yards..... | spool 2 |
| Bandage, gauze, 1 inch..... | dozen 1 |
| Bandage, gauze, 2 inch..... | do 2 |
| Bandage, gauze, 3 inch..... | do 1 |

THE SUPPLEMENTAL MEDICINE BOX—Continued

(MEDICINES, DRESSINGS, ETC.)—Continued

| | | |
|---|---------|-----|
| Bandage, suspensory | | 6 |
| Bismuth Subnitrate (powdered) | bottle | 1 |
| Castor Oil | tin | 3 |
| Collodion, flexible | bottle | 4 |
| Colloidal Silver (argyrol) | do | 5 |
| Cotton, absorbent | roll | 2 |
| Epsom salt | tin | 3 |
| Eye Bath | | 2 |
| Formaldehyde Solution | bottle | 2 |
| Gauze, plain, absorbent | roll | 2 |
| Iodine Tincture (3 vials in package) | package | 2 |
| Lint, absorbent | do | 2 |
| Medicine Glass | | 2 |
| Ointment, Boric Acid | tube | 2 |
| Ointment, Yellow Oxide of Mercury | tube | 3 |
| Pencil, hair | | 4 |
| Prophylactic Tubes | tube | 100 |
| Soap Liniment | bottle | 2 |
| Soda Bicarbonate | carton | 2 |
| Sulfanilamide | | |
| Syringe, penis, rubber | | 12 |
| Tannic Acid Jelly | tube | 6 |
| Thermometer, clinical | | 2 |
| Tourniquet, instant (rubber) (<i>deteriorative</i>) | | 2 |
| Vaseline | tin | 4 |

THE MEDICAL BOAT BOX

| | | |
|---|-----------------|---|
| Jelly of Tannic Acid | 4-ounce tube | 3 |
| Spirit of Ammonia, aromatic, tube and paper cup | 4 in package | 3 |
| Acid, Acetylsalicylic, 5 grains | 100 in bottle | 1 |
| Colocynth and Jalap Compound, N. F. | do | 1 |
| Soda Mint, 5 grains | do | 1 |
| Sodium Chloride, 10 grains (for sodium chloride dispensers) | do | 1 |
| Tincture of Iodine, Mild, 10 cc. applicator vial | 3 in package | 4 |
| Bandage Compress, 2 inch | 4 in package | 2 |
| Bandage Compress, 4 inch | 1 in package | 2 |
| Bandage, gauze, compressed, 1 inch | | 6 |
| Bandage, gauze, compressed, 2 inch | | 6 |
| Bandage, gauze, compressed, 3 inch | | 6 |
| Bandage, triangular, compressed | | 2 |
| Cotton, absorbent, compressed | 1-ounce package | 6 |
| Gauze, plain, compressed | do | 6 |
| Packet, first-aid | | 6 |
| Pins, safety, large | dozen | 1 |
| Splint, wire mesh for, 5 by 36 inches | piece | 1 |
| Tourniquet, Web | package | 1 |
| Shears, 6 inch | | 1 |
| Boat Box, empty | | 1 |

DIRECTIONS FOR USE OF MEDICAL SUPPLIES

TABLETS, PILLS, AND POWDERS

ALKALINE AND AROMATIC (*Seiler*) (tablet). A mild, soothing antiseptic; for sore throat and rhinitis.

Dose.—Dissolve two tablets in half a glass of warm water, and use as gargle or nasal douche every 3 to 4 hours.

ASPIRIN (Acetylsalicylic acid) (5-grain tablet). An anodyne and analgesic; for headache, neuralgia, rheumatism, and fever. May also be used as a gargle in painful sore throat.

Dose.—For headache: One tablet, preferably followed by a half teaspoonful of sodium bicarbonate (baking soda), repeated in 1 hour if necessary.

For sore throat: One tablet dissolved in one-fourth glass of warm water.

BISMUTH SUBNITRATE (powder). An astringent; for diarrhea. Should be mixed with equal parts of sodium bicarbonate (baking soda).

Dose.—One-half teaspoonful of mixture in water every 2 hours until relieved.

BORAX (powder). A mild antiseptic and astringent; to be used in making eye lotion.

Dose. (See under Eye, diseases of.)

BROWN MIXTURE (1-dram tablet). An expectorant; for coughs and bronchitis.

Dose.—One tablet dissolved in the mouth every hour.

Warning.—Limit, 20 tablets in 24 hours.

CALOMEL ($\frac{1}{2}$ -grain tablet). A cholagogue and cathartic; used for constipation and biliousness; also in some fevers.

Dose.—One tablet every hour until five are taken. Should be followed in a few hours or the next morning by a dose of Epsom salt (magnesium sulfate), one tablespoonful dissolved in a small quantity of hot water.

CASCARA SAGRADA (4-grain tablet). A mild laxative; preferable for chronic constipation.

Dose.—One or two tablets at bedtime.

CATHARTIC, vegetable (pills). An active purgative.

Dose.—One to three pills, preferably at bedtime.

CORYZA (tablet). An antispasmodic and sedative; for beginning colds in the head.

Dose.—One tablet every 15 minutes until four tablets have been taken; then one tablet every 30 minutes for four doses; and then one every hour for four doses.

Warning.—Limit, not more than 12 tablets taken as directed. Stop when dryness of the nose and mouth is experienced.

DOVER'S POWDER (5-grain tablets) (**Poison**). A diaphoretic and sedative; used in the beginning of head colds and bronchitis to produce sweating and reduce fever.

Dose.—One tablet. (5 grains.)

Warning.—Should be used with care. Should not be taken on an empty stomach as nausea may result.

IRON, QUININE, ARSENIC, AND STRYCHNINE (tablet). A tonic; for anemia, loss of appetite, and run-down condition.

Dose.—One tablet after meals.

PETROLATUM. (See Vaseline.)

PHENACETIN (5-grain tablet). An analgesic and antipyretic; for headache, neuralgia, and fever.

Dose.—One tablet with a glass of water, repeated in 1 hour if necessary.

PHENOBARBITAL (1½-grain tablet). A sedative and hypnotic; for producing sleep and quieting restlessness.

Dose.—One tablet with a warm drink a half hour before bedtime, may be repeated with caution.

Warning.—Limit, five tablets in 24 hours. An occasional individual is allergic to this drug. In such cases, patients may develop skin rash, high fever and mental confusion.

QUININE SULFATE (3-grain tablet). Antimalarial; for prevention and treatment of malarial fevers.

Dose.—One to three tablets every 4 hours.

Warning.—Limit, 12 tablets in 24 hours. An occasional individual is allergic to this drug. In such cases, patients may develop itching and skin rash, ringing in the ears, nausea, and vomiting. Administration of the drug should be discontinued on the first appearance of any of these symptoms.

SODA MINT (5-grain tablet). Antacid; for sour stomach, indigestion, and heartburn.

Dose.—One or two tablets every hour dissolved in the mouth.

SODIUM SALICYLATE (5-grain tablet). Analgesic and antirheumatic; for rheumatism and rheumatic pains.

Dose.—Two tablets every 4 hours.

Warning.—Limit, 12 tablets in 24 hours. Watch for symptoms of drug intoxication, such as ringing in the ears, nausea, vomiting, and deafness. Administration of the drug should be discontinued on the first appearance of symptoms.

SULFADIAZINE (1 gram tablet). A chemical substance which, when SWALLOWED, destroys or prevents the growth of certain bacteria in the body. These tablets are given ONLY to persons having open wounds of the flesh, bones, brain, etc.

Dose.—4 tablets by mouth—at once. Water can be given to help swallowing. After the initial dose of 4 tablets, if delay is experienced in getting the patient to a doctor, give 1 table (AND ONLY 1) every 6 hours.

Warning.—Do not give these tablets any longer than 2 days.

MEDICINES, DRESSINGS, ETC.

ADHESIVE PLASTER (2 inches by 5 yards, spool) (*deteriorative*). For securing dressings to skin, and for minor abrasions.

AZOCHLORAMID SALINE MIXTURE TABLETS. A mild antiseptic for the treatment of infected wounds. To prepare, place one tablet in 2 ounces of water, crush and stir. Do not use this solution in the eyes, mouth, or nose.

BAG, HOT WATER (rubber) (*deteriorative*). Fill to one-half its capacity with hot water, expelling the air before screwing down the stopper; then hold the bag upside down to be sure there is no leakage. Wrap bag in a bath towel and place over the desired area.

Warning.—Watch carefully to see that bag is not too hot, especially with an unconscious or delirious patient.

BAG, ICE (rubber) (*deteriorative*). Break ice into small pieces by pounding it in a piece of canvas. Fill the bag to three-quarters of its capacity, expel the air, replace cover, and wrap bag in a towel.

Warning.—Never put the rubber directly on the skin.

BANDAGE, gauze (1, 2, and 3 inch). For retaining dressings.

Warning.—Do not bandage too tightly.

BANDAGE, suspensory. For supporting painful testicles, and retaining dressings in cases of orchitis.

BASIN, dressing. For bathing patients and preparing solutions.

CASTOR OIL (cathartic). Useful for emptying the bowel in beginning diarrhea.

Dose.—One to two tablespoonfuls. First wet the mouth with a hot liquid (milk, coffee, or tea), then take the oil and follow with some more of the liquid.

CATHETER (soft rubber, sizes 10 to 20 French) (*deteriorative*). To be used for drawing off the urine in an unconscious patient or one with an obstructing stricture of the urethra. Boil for 10 minutes before use, and handle only with sterile hands. Lubricate with sterile oil or vaseline before passing and use the utmost gentleness. Try the larger sizes first.

COLLODION, flexible. For securing small dressings to the skin, especially the scalp. May be applied with a hair pencil. Keep the bottle securely closed to prevent evaporation.

COLLOIDAL SILVER (argyrol, crystals). A mild antiseptic; for use in inflammations of the eyes and as a preventive and treatment of gonorrhea (clap). Prepare a 10-percent solution by sprinkling one part of the crystals on the surface of 10 parts of boiled, distilled water; later, agitate until completely dissolved.

Warning.—Solutions should be prepared only in small amounts as needed and should not be used after standing more than 1 or 2 days, as the drug tends to deteriorate rapidly in solution. Stains may be removed with bichloride solution.

COTTON, absorbent (roll). For dressings, wipes, and for padding under bandages.

Warning.—Do not place in contact with wounds (use sterile gauze).

DENTALONE (solution). Analgesic for toothache. Apply in cavity on small pellets of cotton after first touched to another piece of cotton to remove excess fluid, and after cavity has been cleaned out and dried.

EPSOM SALT (magnesium sulfate, crystals). A quick acting cathartic; for constipation.

Dose.—One to two tablespoonfuls, preferably dissolved in a small quantity of hot water. Should be taken on an empty stomach. Excellent also as a wet dressing and hot soak. (25 percent solution for inflamed areas and wounds).

EYE BATH (glass). To be used in bathing the eyes. Should be sterilized before using. (See Eye Wash under Eye, diseases of.)

FIRST-AID PACKET. Sterile dressings sealed in tin. For emergency treatment of wounds.

FORCEPS, hemostatic. For catching the ends of bleeding vessels until they are tied (ligated), and for use as a needle holder. Boil, with scissors and dressing forceps, for 15 to 20 minutes before using, and handle only with sterile hands. Dry well after use.

FORMALDEHYDE SOLUTION (Poison). Disinfectant; for use as disinfectant only. Should be kept well stoppered and in a cool place. Two tablespoonfuls of this solution to 1 quart of water serves as an excellent disinfectant for knives, forks, cups, etc. (See Disinfectants.)

Warning.—The escaping vapor is very irritating to the eyes, nostrils, and lungs.

FOUNTAIN SYRINGE (rubber) (*deteriorative*). For giving enemas, washing ears, etc. Fluids flow by gravity and bag should not be elevated more than 2 or 3 feet above the nozzle.

- GAUZE**, plain, absorbent (roll). For dressings, etc. Should not be placed in contact with wounds until sterilized. Cut in pieces as desired.
- IODINE, TINCTURE (Poison)** (mild tincture, in applicator vials). Antiseptic for wounds. Unscrew cap of vial and apply according to instructions or swab out wound with moistened cotton applicator.
- Warning.**—Applied to skin may cause blisters especially when covered by a dressing. Never use iodine in connection with bichloride of mercury.
- LINT**, absorbent (roll). Used as wet dressing and as padding over surgical dressings.
- MEDICINE GLASS.** Graduated in teaspoons and tablespoons, for measuring doses of medicine. Keep clean.
- MUSLIN** (5-yard piece). Cut as desired for supportive dressings, slings, and for special bandages.
- OINTMENT, BORIC ACID** (tube). For dressing healing wounds, and for protecting the skin. Apply on lint, and then bandage.
- OINTMENT, SULFUR** (jar). For itch and ringworm. Rub on affected part thoroughly. (See Itch, treatment of.)
- OINTMENT, YELLOW OXIDE OF MERCURY** (tube). For styes and other inflammations of the eyes and lids. Apply to lids with cotton wrapped on matchstick.
- OINTMENT, ZINC OXIDE** (jar). For eczema, sunburn, etc. Apply locally and bandage.
- PENCIL, hair.** For applying collodion to dressings. Clean brush well after use to prevent hardening.
- PINS, SCISSORS, AND DRESSING FORCEPS** (set in case). For applying surgical dressings; the forceps for holding edges of wounds while suturing, and scissors for cutting sutures and dressings.
- PROPHYLACTIC TUBES.** For venereal prophylaxis. To be used in accordance with accompanying instructions.
- SOAP LINIMENT.** Use with massage for lumbago, painful muscles, sprains, etc.
- Warning.**—External use only.
- SODA BICARBONATE** (powdered). Antacid; for indigestion and heartburn. Also for use with Bismuth Subnitrate (see above), and for preparing eye wash (see Eye, diseases of).
- Dose.**—For indigestion: one-half to one teaspoonful in water.
- SPATULA** (3 inch). For mixing and spreading ointments on dressings.
- SPIRIT OF AMMONIA, AROMATIC** (bottle). Antacid and diffusible stimulant; for faintness.
- Dose.**—By mouth: one-half teaspoonful well diluted with water; by inhalation: from saturated gauze or handkerchief.
- SULFANILAMIDE** (sterile powder in 5 gram package). A special antiseptic for severe wounds of muscle, bone, brain, chest, and abdominal organs.
- Dose.**—Dust the powder evenly into the deep recesses of and over entire wound (or wounds).
- Warning.**—Do not apply powder too thickly. Do not give by mouth. Do not use in connection with iodine or any other chemical substance.
- SUTURE**, surgical gut, untreated (boilable, No. 2, threaded in needle) (tube). For ligating blood vessels which must be buried. Place tube in formaldehyde solution, or boil with instruments. Break at file mark in sterile gauze, and handle only with sterile hands. Use hemostatic forceps as needle holder.
- SUTURE**, surgical gut, mild treatment (boilable, No. 2, threaded in needle) (tube). For suturing wounds. Handle as above.

SYRINGE, penis (rubber) (*deteriorative*). For injection of argyrol solution into urethra as preventive and treatment of gonorrhea (clap). Do not inject more than $1\frac{1}{2}$ teaspoonfuls at a time.

TANNIC ACID JELLY (tube). Antiseptic and astringent for burns. Spread lightly over affected area and, if necessary, cover loosely with bandage. Do not use grease or oil. Apply fresh dressing daily.

THERMOMETER, clinical (in case). For taking patient's temperature. (See note under Fevers.)

Warning.—Fragile.

TOURNIQUET, instant (rubber) (*deteriorative*). For control of hemorrhage. To be wrapped around limb above bleeding point enough to stop the bleeding until other means can be taken. Do not tie, but secure end by placing a loop under one of the turns. Use with caution. (See under Hemorrhage.)

VASELINE (tin). Protective ointment and lubricant. Apply locally for sunburn, chapped hands, etc. May be used as a lubricant for catheters, rectal tubes, etc.

WIRE MESH, for splints (roll). For immobilizing fractured limbs and dislocations. Cut to desired size with heavy shears and mold to affected part after thorough padding. Secure with bandage.

Chapter II

FIRST AID

GENERAL INSTRUCTIONS

Do not attempt to rival the doctor, but aid him through emergency measures, and thus put the patient into his hands with a better chance of recovery than would have been the case if prompt and efficient emergency treatment had not been rendered.

In the presence of an accident the person giving first aid must take charge, if the services of a doctor cannot be obtained, and he should observe the following general rules:

1. Be quiet and cool, don't get excited, and do the best possible with the facilities at hand.

2. Give the patient plenty of air; keep the crowd from gathering around, many of whom will be there only for curiosity. Keep only those around whose assistance may be needed.

3. Lay the patient on his back, with head lower than the body, except in cases with marked flushing of the face or with difficulty in breathing, when the head may be raised a little on folded clothing or other suitable material.

4. If there is vomiting, turn the head to one side so the vomited matter may easily escape from the mouth. This eliminates the risk of vomitus going into the windpipe and choking him.

5. If the patient is unconscious, do not try to force him to drink, for he cannot swallow and may choke.

6. Do not move patient from place of injury unless his condition justifies it. Often the injury will have to be attended to before it is safe to move him.

7. Loosen tight clothing which may be present around the neck, chest, abdomen, legs, and ankles, such as collar, belt garters, and shoelacings.

8. If stimulants are needed, whisky and brandy are not always indicated. In fact, there are conditions in which they do harm. Aromatic spirit of ammonia, if on hand, is safer for general use.

9. In order to treat the injury the part has to be exposed and the clothing in some cases has to be removed. This should be done in such a manner as to disturb the patient as little as possible. The outer clothing should be ripped up the seam; the underclothing torn or cut. The uninjured side should be undressed first. In removing

the shoes it is often necessary to cut them off when they cannot be removed otherwise without causing great pain or increasing the injury.

10. An injured person often wants a drink of water. If conscious and able to swallow, a few sips of cold water will be very refreshing.

11. If several injuries are present, care for the most severe one first.

12. Don't put fingers into the wound; they carry germs, and will infect the wound.

INJURIES

SHOCK

As almost all injuries cause a certain amount of shock, it is well to know what it is and how to treat it. It is a profound depression of the nervous system and is sometimes called collapse, exhaustion, or prostration. In this condition the face is pale, expression is anxious, eyes dull, and pupils enlarged, skin cold and clammy; patient is listless and takes no interest in surroundings; pulse is rapid and weak; breathing may be gasping, spasmodic, or feeble.

Treatment.—Place on back with head low, administer stimulants: hot coffee, tea, aromatic spirit of ammonia, whisky, or brandy. Keep up body heat, wrap in warm blankets, apply hot-water bags, and rub extremities toward body to stimulate circulation. If patient is unconscious, do not give anything by mouth.

BRUISES

These are conditions where the soft tissues below the skin are injured and torn, the skin itself remaining intact. There is hemorrhage under the skin but the blood does not escape.

Symptoms.—Pain, loss of function, swelling, and discoloration. A recent bruise is usually red, purple, or black, later turning to green or yellow.

Treatment.—Put the part at rest. Apply cold applications, and keep the injured part at rest.

WOUNDS

These are usually divided into the following classes:

Incised.—Incised wounds are those caused by sharp instruments, such as a razor, sharp knives, glass, etc.

Lacerated.—Lacerated wounds are those caused by a blunt instrument, by machinery, a falling block, etc.

Punctured.—Punctured wounds are those caused by long pointed instruments, such as a nail, dagger, bayonet, etc.

Poisoned.—Poisoned wounds are those caused by bites of animals, stings of insects, etc.

Gunshot.—The term “gunshot wound” is self-explanatory.

Symptoms of wounds.—Local—(1) pain; (2) hemorrhage; (3) loss of function; (4) gaping of edges. General—shock.

The dangers from wounds are hemorrhage and infection. As has been stated, grave hemorrhage is usually rare, and a compress and bandage is usually all that is necessary to check it. Infection is the main danger. By this is meant the introduction into the wound of germs, which will cause pus and later trouble. The main effort in treating wounds is to prevent infection.

TREATMENT OF WOUNDS

Prevent infection.—Do not touch the wound with dirty fingers and do not let the patient do so. If wound is not extensive and there is very little bleeding or dirt or foreign particles in it, apply into and for about 1½ inches distance around the wound tincture of iodine. Then apply to the wound a sterile gauze compress and hold it in place by a snug bandage.

If the part injured is a hairy part of the body, the hair should be shaved off before treatment. If iodine is to be used, it would be better to shave the part dry, as iodine is less active on a moist surface.

Before dressing a wound the dresser should see that his hands are surgically clean. To render them so, scrub for at least 10 minutes with a nail brush, hot water, and soap. Rinse off soap with hot water, and do not put the fingers into the wound unless absolutely necessary. These are the two essential features of aseptic work.*

If foreign particles are in the wound they may be picked out with a pair of sterile forceps. If it becomes necessary to wash a wound to get the dirt out, use sterile hot water, soap, and a pad of sterile gauze as a sponge. A boiled common-salt solution (1 teaspoonful to a pint of water) is a very good one with which to wash and dress wounds. Be sure the water is sterile before applying it to the wound. (Should be boiled at least 20 minutes.)

The dressing contained in the first-aid packet, although intended for a gunshot wound of small caliber, makes an excellent dressing for any wound it will cover and may be applied after the wound has first been treated with tincture of iodine.

SEVERE WOUNDS

In case of shell injuries, gunshot wounds, or any jagged and deep wounds with the edges separated, remove any foreign particles if possible, and clean the wound as has been previously described. Open one

*Azochloramid solution may also be used as a wet dressing or hot soak. To prepare it, place one tablet in 2 ounces of water, crush and stir. Do not use this solution in the eyes, mouth or nose.

small packet marked *Sulfanilamide*† and dust the powder evenly over the entire wound.** If one packet of powder does not cover the area completely, another may be used.

Now open a package of tablets marked *Sulfadiazine* and give him 4 tablets. If there is a delay in getting the patient to a doctor, open another package of sulfadiazine, and give him 1 tablet (AND ONLY 1) every 4 hours during the day. Do not give these tablets any longer than 2 days. These tablets taken by mouth help to prevent infection.

It is better for the layman not to sew a wound, but at some time or other it may be necessary. Sometimes in wounds of the scalp the best way to check the hemorrhage is to bring the edges of the wounds together by suture. Usually, however, a bandage or tourniquet carried around the forehead just above the eyebrows, then just above the ears, and continued low down on the back of the head to the starting point and drawn tight will stop bleeding of the scalp. A stitch may prevent marked scarring. However, this should not be given much consideration by the one giving first aid, except for cosmetic purposes on exposed parts of the body. If necessary to suture a wound, remember that the hands, needles, all instruments, etc., that come in contact with the wound should be sterile.

The stitches should pierce the skin about one-eighth inch from the edge of the wound, and they should be placed about one-half inch apart, tied, and cut off. They should not be tied too tightly, only sufficient barely to bring the edges together. Knots should be on the outside of the wound. It is better not to close the wound entirely, but to leave a little opening at its lower end, where a little wick of sterile gauze may be inserted for drainage. If after stitching a wound it becomes red, swollen, and painful, or there is other evidence of pus forming, the stitches should be removed and the wound left open. Carry the needle through the entire thickness of the skin. Remember that occasions will be few where a layman will have to stitch a wound.

In all wounds, put the part at rest and treat shock if present.

To treat gunshot wounds, see instructions in first-aid packet.

Sterilizing dressings.—An easy and convenient way is by boiling in plain water for about 20 minutes. If a dry dressing is desired, it can be sterilized by placing in a hot oven for about 20 minutes and removed just before scorching. Sterile dressings can be bought. The contents of a first-aid packet are sterile.

Sterilizing instruments.—The scissors, forceps, knives, needles, etc., used in dressing wounds should be sterilized by placing them in

†Sulfanilamide can be used with sterile water or with sterile salt solution BUT MUST NOT BE USED with azochloramid, iodine, salts of mercury or any other antiseptic substance, in the treatment of wounds.

**Sulfanilamide powder may be used on the spinal cord or on open wounds of the head even when the brain is exposed. It may also be used on nerves if exposed in the wound.

water that has been brought to a boiling point and boiling them for 15 to 20 minutes. If on hand, a little soda added to the water will greatly assist the sterilization and protect the instruments. It is better to protect the blade of the knife by wrapping a little cotton around it before boiling.

Remember in dressing wounds to apply the pad of sterile gauze, then the bandage. In large wounds, or those from which there is liable to be considerable oozing, it is probably better after the pad of sterile gauze has been applied to apply several layers of absorbent cotton, then the bandage. Do not put the cotton next to the wound.

EXPOSURE—THIRST—STARVATION

As a result of climatic heat and cold, storms, or loss of ships at sea, personnel are frequently found suffering from the effects of exposure, thirst and starvation. The condition of the patients can be extreme. They may show pneumonia (with or without temperature), hysteria or coma, bleeding and ulceration of the skin, great loss of flesh, feeble pulse and respiration, and exhaustion. Some cases will have untreated and infected injuries—some of long duration.

Those suffering the extreme effects could be expected to be found among people rescued at sea.

Treatment.—Careful handling of the patient, absolute rest, control of hemorrhage and shock, dressing of wounds, reduction and splinting of fractures, application of heat, stimulation of circulation by gentle massage and administration of hot, nutritious liquids, in frequent though very small amounts at first and very gradually increased.

Cases mildly exposed to wet and cold.—Remove wet clothing, massage body with towel, give hot, stimulating drinks (black coffee and whiskey), rest, and observe in a warm protected place for several hours.

BITES FROM ANIMALS

Animal bites may transmit rabies through the saliva if the animal has the disease. Most warm-blooded animals are susceptible to rabies but responsibility for its presence and propagation rests mainly upon the dog. Bites on the head, neck, and upper extremities, being nearer the brain, are the most dangerous.

It is a common error to assume that a dog with fits is mad or rabid. As a matter of fact, fits resulting from worms, from acute indigestion, and from exposure to excessive heat are common in dogs. On the other hand, the so-called "dumb rabies" occurs without fits and is common. In "dumb rabies" there is usually increased affection, as if imploring help; the animal cannot close its mouth, the tongue protrudes, and saliva flows in excess. It is this condition which leads many sympathetic people to imagine the dog has

a bone in its throat and to try to remove it. In doing so, their hands become covered with infectious saliva. While no one but a skilled veterinarian is competent to judge from the symptoms that an animal has rabies, any unexplained change in behavior followed by excitability or paralysis should be looked upon as due to this disease. Until proved to the contrary, any biting animal should be suspected as being rabid and any unidentified animal should be regarded as rabid.

When a person is bitten by an animal suspected of being mad, it is not only important to treat the patient, but to take steps to ascertain positively whether the bite was dangerous or not, as a long time may elapse before any symptoms develop and this period might be fraught with needless and terrible anxiety for the patient. Keep the animal under observation to see whether or not it shows signs of madness. If it dies, decapitate the animal, pack the head in ice, and send it to some laboratory for examination. Unless to protect others, it should never be killed. If the animal appears normal and remains so for a period of from 10 to 14 days, the possibility of infection may be dismissed. In the meantime the person bitten should be transferred to the nearest naval or civilian hospital accompanied by a complete report of the circumstances involved in the injury.

Wounds inflicted by an animal suspected of being rabid or of having rabies are to be treated in the following manner: The wound should be enlarged with a knife, if necessary, and encouraged to bleed by milking the part, or by applying a tourniquet lightly above it for a short time. It should be mechanically cleansed with soap and water and painted with tincture of iodine. A red-hot needle may be used to cauterize the wound. Do not use silver nitrate or phenol for cauterizing these wounds as they coagulate the albumin in the tissues thereby producing the conditions necessary for infective organisms and retarding their destruction. The wound should then be dressed with an antiseptic dressing. The Pasteur treatment must be given if there is any question of rabies.

BITES FROM INSECTS

Poisoned wounds due to causes other than bites of poisonous snakes include ordinary insect bites, such as those produced by mosquitoes, fleas, ants, and bees. These bites require but little treatment. As the poison of insects is composed chiefly of an acid, the local application of some alkali should be employed; either ammonia water or a solution of washing soda affords great relief. Bites of the more poisonous spiders, centipedes, tarantulas, and scorpions require prompt treatment. (See under Snake Bites.)

BITES FROM POISONOUS SNAKES

Tie a ligature or tourniquet about the injured part between the wound and the heart to prevent the absorption of the venom into the general circulation; enlarge the bite by making an incision at its site, suck out the wound to produce bleeding, and apply tincture of iodine. If there be abrasions or open lesions in the mouth it is not advisable to suck the wound. Meanwhile, give stimulants such as coffee or tea and get the person to a doctor as soon as possible. The tourniquet should be loosened about every half hour to allow restoration of the circulation, but should be tightened up immediately if symptoms of general poisoning occur. Apply a dressing to the wound and treat shock which sometimes occurs in these cases. There are anti-venin serums available for the treatment of poisoning by snake bite. They are injected hypodermically or intravenously and are very effective if properly used.

HEMORRHAGE

The heart may be considered as a pump, which by its beats forces the blood to all parts of the body through a series of tubes. The arteries carry the blood from the heart; the veins return the blood to the heart. The capillaries are a network of smaller vessels situated between and connecting the arteries and veins.

Remember that in the character of wounds that ordinarily will be encountered death from bleeding is very rare. Bleeding is dangerous when a large artery is injured. In the majority of cases of bleeding all that will be necessary to do is to put a gauze compress over the wound and hold it in place by a firm, snug bandage; put the injured part at rest; if arm or leg, elevate; keep the patient quiet and give plenty of fresh air.

If, however, bleeding is profuse and life seems endangered, it may be necessary to apply some kind of tourniquet. Arterial bleeding is most dangerous and is recognized by the fact that the blood is bright red in color and is expelled in jets.

In venous bleeding the blood is dark and flows in a constant stream.

Capillary bleeding occurs as a general oozing and is of a brick color.

Tourniquets may be improvised, as a clean handkerchief bandage, soft-rubber tubing, or other similar material, encircling the limb, and tied sufficiently tight to stop the flow of blood.

Tourniquets in the hands of laymen are extremely dangerous and should not be used unless absolutely necessary, which is rare. When used, the part should be carefully watched, and if signs of extreme swelling or bluish color of the skin appear the tourniquet should be loosened. A tourniquet should not be left on at one time more than

one-half hour. It should then be loosened and, if necessary, re-tightened. The arms and legs are the only parts to which tourniquets should be applied.

Arterial hemorrhage.—Apply the tourniquet between the heart and the wound; generally speaking, above the wound. Place a compress over the wound and hold by snug bandage. Put part and patient at rest.

Venous hemorrhage.—Apply tourniquet on far side of wound from heart; generally speaking, below the wound. Then treat as for arterial hemorrhage.

Capillary oozing.—Pressure by compress and bandage applied over the wound is all that is usually necessary.

Bleeding can often be stopped by pressure from the thumb, or anything else suitable, over the injured artery or vein. The pressure should not be made in the wound.

It is often difficult to determine whether the blood is from an artery or vein. In such a case, if a tourniquet is necessary, apply it above the wound; and if injury is in arm or leg, apply the compress over the wound, hold it with a snug bandage, and put part at rest, elevated. Remember that tourniquets, as a rule, are condemned and should not be used by the layman unless necessary.

The main arteries in the body which play a part in external hemorrhage are four, namely the carotid, which supplies the head; the subclavian, supplying the middle of the shoulder; the brachial, running along the inner side of the arm and supplying the arm, forearm, and hand; and the femoral, running along the inner side of the thigh and supplying the thigh, leg, and foot. The pulsations in these arteries should be studied, as pressure at the correct spot on them will often check external hemorrhage in the extremities, neck, or head.

Internal hemorrhage.—Caused by wounds usually of abdomen or chest. No external evidence of bleeding. Symptoms are those of shock and possibly vomiting of blood, rigid abdomen. Treatment: Rest in bed; ice bag or cloth to chest or abdomen. Do not give stimulants unless patient becomes very weak. Contact a doctor immediately.

Nose bleeding.—Place patient in chair with head thrown back. Apply cold cloths to back of neck. Place a small wad of paper well up between the upper lip and gum. Finely crushed ice on gauze or thin cloth applied to bridge of nose is often effective. If it still persists, small strips of gauze with ends hanging out may be pushed up the nostrils. Keep patient quiet and instruct him to breathe through the mouth. He should be cautioned not to pick off or blow out the clots as they form in the nostrils.

BURNS

Burns result from exposure of the body to dry heat, while scalds follow exposure to moist heat, as hot water, steam, etc. These are very serious accidents, attended, at times, with marked shock, and their danger to life depends more upon the extent of the body involved than the degree.

For convenience burns are classed in three degrees, as follows:

First degree.—Reddening of the skin.

Second degree.—Reddening of the skin with formation of blisters.

Third degree.—Charring and destruction of the deeper tissues.

There is usually considerable pain with burns and, if burn is extensive, marked shock.

Treatment.—In other than minor burns, the bowels must be kept open, plenty of water given by mouth and also at times by rectum, so that the kidneys will continue to act. The greater the area burned the more necessary is this treatment. Air must be excluded from the burned part which may be done by means of tannic acid jelly dressings, or by a paste made with water and baking soda, starch, or flour. If the burn has been caused by a caustic such as an acid or an alkali, the acid should be neutralized with bicarbonate of soda (ordinary baking soda), and the alkali by a weak solution of acetic acid (ordinary vinegar) before the burned area is covered. Whenever possible burns should first be treated by the tannic acid jelly. If a person is extensively burned, the quickest temporary means of excluding air is to immerse the part or the entire body in lukewarm water, then, having everything in readiness, carefully cut away the clothing, leaving such as may be sticking to the burned skin. The application of tannic acid jelly dressings should then follow and the patient put to bed. In case the supply of tannic acid jelly is inadequate, a satisfactory tannic acid solution can be made by pouring one quart of boiling water over 2½ ounces of tea leaves. Allow to steep for at least 15 minutes, then strain. This solution can be applied to the burned area by means of an atomizer or sterile cotton applicators. Several coats of the tannic acid solution are applied while an assistant fans the areas to promote the tanning process. The tannic acid unites with and “tans” the tissues in the raw areas. When “tanning” is complete, the burned areas have become dark brown in color, and when they have dried they are covered with a hard, leathery crust of a dark brown or black color. Unless infection occurs beneath it, the crust should not be disturbed until it begins to curl up at the edges and to peel off of its own accord, when the loosened parts may be cut away with sterile scissors.

The effectiveness of this method of treating burns is seriously interfered with if oils, ointments, or other greasy substances have pre-

viously been applied to the burned areas. Any oil, ointment, or grease that is present must be gently but thoroughly removed with a sterile swab and the area sponged with a weak solution of sodium bicarbonate before the tannic acid treatment is begun, even though it may cause considerable suffering.

If tannic acid is not available an excellent dressing is a solution of ordinary baking soda (2 tablespoonfuls in a pint of boiled water). A salt-solution dressing is also good (a teaspoonful of common salt to a pint of boiled water). Do not use strong antiseptics on burns. Soaking the part in lukewarm water is itself good and is very often useful to soak off clothing sticking to a burned surface. If blisters have formed and are painful, they may be opened by passing a sterile needle through them and allowing the fluid to escape. Do not destroy the skin raised by a blister. The needle used may be sterilized by burning in a flame. Do not put cotton next to a burn; it sticks and causes trouble. In dressing burns take a pad of sterile gauze, soak in the solution, apply to part, and hold in place by bandage. In removing the dressings it is often necessary to soak them off, and warm water or one of the solutions mentioned may be used for this purpose.

The burned part should be put at rest and if there is much pain phenobarbital and aspirin tablets may be given. There is liable to be considerable shock so don't forget to treat it. A person badly burned should be seen by a doctor as soon as possible.

EFFECTS OF COLD

Freezing.—If expecting to be exposed to the cold for a long time, endeavor to prevent any ill effects therefrom, but if freezing does occur there is marked depression and cautious treatment is necessary. Wind velocity and moisture are factors which predispose to frost-bite. Wet clothing, shoes and socks favor chilling by conduction of heat away from the body.

Treatment.—The object is to restore gradually the body warmth. The patient should at first be in a moderately cold room, and with woolen cloths soaked in cold water or snow, the limbs should be gently and systematically rubbed toward the body. When the circulation becomes active, the cloths should be soaked in warmer and warmer water. When patient can swallow, give stimulants, such as hot coffee or tea, whisky, brandy, or aromatic spirits of ammonia. The patient should not be brought into a warm room, placed before an open fire, etc., until the circulation of the blood has been reestablished and is active, as evidenced by increased force of the pulse, increased warmth, and color to the skin.

Frostbite.—Parts most involved are those where circulation is sluggish, as ears, nose, tips of fingers and toes, etc.

Treatment.—Gradually restore normal temperature. Soak part in cold or ice water. Apply with woolen cloth soaked in cold water, ice water, or snow. Gradually increase warmth of water as circulation becomes reestablished and active in part, as evidenced by more warmth to skin and better color. If the frostbite is an old one and the skin has turned black or commenced to scale off, it is dangerous to attempt to restore the vitality by friction; just apply a little cotton and hold in place by a bandage; apply heat externally.

STRAINS

A condition caused by overstretching the muscles. The muscles of the back and shoulders are the ones most often involved.

Symptoms.—Pain, stiffness, lameness, and sometimes swelling.

Treatment.—Rest, hot applications, gentle massage with liniment.

SPRAINS

A condition caused by a momentary dislocation of a joint with tearing or stretching of the ligaments and capsule about the joint. At times it is hard to distinguish from a fracture and should be cautiously handled. It often takes a long time for complete recovery.

The joints most often involved are the ankle, knee, wrist, elbow, and shoulder.

Symptoms.—Pain, redness, swelling, loss of function, and often shock.

Treatment.—Soak the joint in water either as hot as patient can stand or as cold as it can be made; tepid water is valueless. If it is a joint of the lower extremity, put patient to bed and elevate the limb on a pillow or other support and apply hot or cold compress until pain has subsided.

If joint is bandaged, do this loosely, because there is liable to be considerable swelling, which may cause damage. When pain and swelling have subsided, gently massage the joint. Let patient get about gradually on crutches. If sprain is in upper extremity, the treatment is the same, except the patient need not stay in bed. The joint is put at rest and supported either by a sling or splint. If shock is present, it should be treated.

DISLOCATIONS

These are injuries to joints; the head of a bone has slipped out of its socket.

Causes.—(1) From a blow or fall; (2) muscular action.

Symptoms.—Shock, pain, swelling, loss of function, limited motion, and the head of the bone may be seen out of its usual place. The limb

may seem lengthened or shortened, according to the way in which the dislocation has taken place.

Treatment.—The proper treatment is reduction and retention by some means of immobilization. It is better for a layman not to attempt reduction except, perhaps, in dislocations of the fingers and the lower jaw. By unskilled attempts at reduction a layman may cause considerable damage to the nerves, vessels, and soft parts.

Put the part in the position most comfortable to the patient. The joint should be surrounded with cotton and a bandage applied, not too tight, and then supported. The patient should be kept as quiet as possible. If the joint involved is the shoulder, elbow, hip, knee, or ankle, the patient should be kept in bed. If the joint is painful and greatly swollen, hot or cold applications may be applied. A sling makes a good support to the shoulder, elbow, and wrist joints. If shock is present, treat it. Have patient see a doctor as soon as possible.

FRACTURE (BROKEN BONE)

Causes.—(1) Direct violence, (2) indirect violence, (3) muscular action.

Symptoms.—(1) History of injury, (2) pain, (3) swelling, (4) loss of function of parts, (5) usually shortening, (6) excessive mobility (movement) where there should be none, (7) crepitus or grating of the ends of bone, (8) deformity.

Varieties.—

Simple fracture, where the skin is intact and there is no external wound.

Compound fracture, where the skin is broken and the external wound communicates with the fractured bone.

Complete fracture, where the break extends through the entire bone.

Incomplete fracture, where the break is not entirely through the bone.

Treatment.—The thing to do is to set the bone and hold it in place by means of splints. A broken limb should be handled as gently as possible. It is usually best not to move the patient, especially if the break is in a lower extremity, until a splint has been applied. In handling a fracture the limb should be grasped above and below the site of fracture.

To treat a fracture of the arm or leg, grasp the limb above and below the site of break, make gentle extension and counterextension (pulling in one direction on one fragment and pulling in the opposite direction on the other) in the line of the body, and while held in that position by an assistant, splints should be applied. Observe the precautions mentioned under the heading of "Splints." After application of splints the limb should be supported and elevated over pil-

lows, clothes, sheets, etc. After application do not remove splint unless it becomes loose or shows evidence of being too tight, etc. Have the patient see a doctor as soon as possible.

Compound fracture.—This is the most serious of all fractures in that the broken bone has been exposed to the air and infection. Clean carefully around the broken skin using the method described on page 15, and follow the same procedure in dusting on *sulfanilamide* powder and the taking of *sulfadiazine* by mouth. Reduce the method described in the previous paragraph. Dress the wound, then apply the splint. The splint should be so arranged that the wound can be dressed if necessary. In all fractures you may have to treat shock. Remember the one great thing in treating fractures is to keep the bone at rest, so do not move the limb or let the patient move it without reason. This fracture is very serious and the patient must immediately be taken to a doctor.

SPECIAL FRACTURES

Fracture of skull.—These are very serious injuries. Apply sterile dressing to wound. Place patient in lying position with head slightly elevated. Shock may have to be treated, but do not give stimulants unless patient is very weak.

Whenever a man is unconscious from overindulgence in alcohol, it is well to bear in mind the possibility of fractured skull and brain injury also. This is especially true where there is any mark of a blow or cut, however slight, on the head. With such a complication the gentlest treatment is necessary.

Fracture of nose.—Treatment: Put bones in natural position. Put small compress of gauze on each side of nose, then a piece of adhesive plaster across nose from cheek to cheek. If adhesive plaster is not at hand, put bandage across nose and around head. Do not tie too tightly.

Fractured back.—Keep patient still and quiet on his back. Treat shock.

Fractured lower jaw.—Treatment: Raise the broken bone and bring lower teeth against upper and hold there by a bandage carried under the chin, tied over the head and maintained in position by pinning to another bandage running horizontally around forehead and back of head. The mouth should be kept clean by a little warm water, plain, or to which a little soda or salt is added if on hand. The patient will have to subsist for a while on liquid food through a tube.

Fractured collar bone.—Apply a pad of gauze in the armpit of the injured side. Support the arm in a sling with the forearm at right angles to the arm and across the chest.

Fracture of rib.—Keep patient quiet in bed. With arms over head and chest emptied of air, apply snugly a wide roller bandage or

adhesive straps around chest. To apply adhesive straps first tear off strips of adhesive plaster 2 or 2½ inches wide and long enough to reach around the injured side from the far side of the spine behind to just beyond the midline of the chest in front. Apply the first strip well below the fracture and gradually work up to above the fracture. Each strip should be applied with firmness, at the end of a forced exhalation, from behind to front, and should overlap one-third of the one below.

Fracture of the upper arm.—Straighten so as to put in natural position. Secure two splints (flat wood shingle, cardboard, etc.), one to extend from shoulder to elbow, the other from armpit to elbow. Pad well with cotton, apply one to inner and one to outer side of arm, secure by bandage, and support in sling.

Fracture of forearm.—Straighten so as to put in natural position; secure two splints as above to extend from a little below elbow to middle of hand. With forearm across chest and thumb up apply padded splints, one to outer and the other to inner side of forearm; then support in sling.

Fractured wrist.—Treat like fractured forearm.

Fractured finger.—Draw gently into natural position. Apply narrow padded splint to palm surface of finger, hold in place by narrow bandage, and support forearm and hand in a sling.

Fractured hand.—Apply padded palm splint as wide as the hand and to extend from above the wrist to beyond tips of fingers; hold in place by a bandage and support forearm and hand in sling.

Fracture of thigh.—By gentle extension and counterextension pull parts into natural position. While limb is held by an assistant, apply a well-padded outer splint to extend from armpit to below foot. Then apply a well-padded inner splint to extend from crotch to below foot. Hold splints in place by a snug bandage.

If nothing else is at hand, the injured leg may be splinted by bandaging it to the other leg.

Fracture of lower leg.—An excellent splint can be made by placing the leg on an ordinary pillow and tying the pillow around it; fastenings above and below should be well away from point of fracture. Wooden splints may be applied on the outside of the pillow, extending from above the knee to below the ankle. The wooden splints well padded, may be applied without the pillow.

Fractured kneecap.—Straighten leg. Pad well a wooden splint as wide as the thigh and long enough to extend from middle of thigh to middle of lower leg. Apply splint to back of thigh and leg, with center opposite bend of the knee. Secure by strips of bandage. Do not bandage directly over break, but apply one strip above and one below knee.

Fractured foot.—Apply a well-padded splint as wide as foot from heel to toes. Elevate and support.

RUPTURE (HERNIA)

As encountered by the layman this is usually a swelling in the groin. Rupture makes its appearance suddenly after exertion and is evidenced by pain and swelling.

Treatment: Let patient take a hot bath and go to bed, lying on his back with thighs bent. By so doing, the rupture will often reduce itself. Keep patient in bed for several days and do not let him move until he has seen a doctor.

If the rupture does not reduce itself it may be damaged by rough or unskilled handling. The patient should see a doctor as soon as possible, as the condition, if unrelieved, may cause gangrene of the bowel and death.

BANDAGING

Those bandages most frequently used are the—

1. Roller bandage.
2. Triangular bandage.
3. Many-tailed bandage.

Bandages are used (1) to hold dressings in place, (2) to hold splints in place, (3) to check hemorrhage, (4) as slings.

Materials most commonly used for bandages are (1) gauze, (2) muslin, (3) flannel, (4) plaster. The gauze and muslin bandages are the two that the layman will be called upon to use, generally gauze. Good bandaging comes by practice, and all that will be expected of the layman is the application of the bandage so it will accomplish its object, be comfortable to the patient, and do no damage. Bandage uniformly, firmly, but not tightly. In bandaging an arm or leg commence from below and bandage up. Leave the tips of fingers and toes unbandaged, so the effect of the bandage on the circulation can be watched. In bandaging a part that is liable to swell, bandage loosely, so if the part should swell the bandage will not be too tight and constrict. Do not apply a bandage when wet, because when it dries it will shrink. In bandaging apply the bandage to the part in the position in which the latter is to be carried during treatment. A bandage should not be put on under a splint, but always over it. A dressing may be applied under a splint, as it is not to be changed until the temporary splint is removed. The triangular bandage is probably the easiest for general application by the person giving first-aid, but as the roller bandage is supplied, it is the one that probably will be most used. The triangular bandage is usually made from unbleached cotton cloth, though any strong cloth will do, such as bed sheets, pillow covers, napkins, handkerchiefs, etc.

A triangular bandage is extremely useful because of its simplicity. It can be used as a tourniquet, as a sling for arm or forearm, and to retain a dressing. The blue-jacket's black-silk neckerchief furnishes a good triangular bandage, or one can be made by cutting in two, diagonally, a square of muslin or sheeting about 36 inches on each side.

To use the triangular bandage as a sling or tourniquet, bring the apex or point of the triangle over to the base and then fold the whole again on itself. If the ends are now knotted at the back of the neck, the hand or forearm can be passed through and supported by the loop thus made. Or fold the triangular bandage with its base up and down (vertically) along the front of the body from collar bone to thigh, with the apex or point of the triangle pointing to the injured side. Bring the forearm to be supported across the bandage. Next bring up the lower end of the base in front of the injured forearm and knot the two ends of the base behind the neck. The apex is then folded inward across the arm above the elbow and pinned to the front and back portions of the sling.

To hold a dressing in place on hand or foot, or to protect them, proceed as follows: Fold the base over on itself a couple of inches. Lay this folded base of the triangle under the wrist or under the sole of the foot a few inches back of the heel. Bring the point or apex up over the fingers to the wrist or over the toes to the instep and ankle. Next, wrap the long ends of the base round and round the wrist or ankle and tie them. The point or apex caught by the circular turns is then folded back over the knot and pinned. The same principle can be used on almost any part of the body. For example, to cover over the scalp, lay the apex or point on the center of the forehead, extending down on the nose, while the base lies on the back of the head and neck. Bring the ends of the base forward and upward just above the ears and tie them low down over the center of the forehead. The apex or tip is then folded back over the knot and secured with a safety pin.

Roller bandages.—These are furnished already prepared, but in an emergency where none are at hand they can be improvised from sheets, pillow covers, muslin, flannel, etc. Those that are furnished come in different widths and lengths. The size to be used depends upon the part to be bandaged.

For the fingers and toes the one about 1 inch wide should be used.

For the arm and head use one about 2 inches wide.

For the leg and thigh use one about 3 inches wide.

For the chest and abdomen use one about 4 inches wide.

For general use the most serviceable bandage is about 2 inches wide and about 4 yards long.

The roller bandage is applied by holding the roller in the right

hand and the free loose end in the left, and the outer side of the bandage is applied on the place where it is desired to start the bandage. In securing the bandage the free end is turned back and pinned, preferably with a safety pin, or the end may be ripped up the middle a sufficient distance, then a knot tied to prevent further ripping, and the ends carried around the limb in opposite directions and tied.

SPLINTS

After considering fractures it is necessary to state something about splints, the correct application of which is so essential in the treatment of fractures.

A splint is a more or less stiff support that will immobilize a fractured bone or a joint. It can be made from pieces of wood, broom handles, cardboard, wire netting, rolls made of blankets, pillows, rifles, swords, bayonets, etc. The material should be rigid enough to keep the parts in position. The splints should be long enough to prevent movements in the nearest joints and as wide or wider than the limb to which applied, so that the bandages which hold them in place will not press on the limb. They should be well padded with cotton or other soft material, as wool, oakum, flannel, etc., before being applied. The padding should extend well over the side of the splint. After a splint has been well padded and applied to the limb it is held in place by a snug bandage. The bandage should not be applied too tight, and if pain and swelling occur it should be loosened.

UNCONSCIOUSNESS

The common causes for unconsciousness are asphyxiation, bleeding, shock, electric shock, heat exhaustion, freezing, sunstroke, epilepsy or fits, apoplexy and injury to the brain, alcoholism and certain other poisons, hysteria and uremia (deficient secretion of urine). In all cases of unconsciousness strenuous efforts should be made to bring the patient under the care of a medical officer as soon as possible.

If the person is unconscious and the cause is unknown, let him rest flat on his back. If he is pale and the surface of his body is cold, apply heat to the body and hold smelling salts or a little ammonia under his nose. If the surface of the body is very hot, cold water and ice bag should be applied to the head.

Patients who have been rendered unconscious because of injuries should, in general, be treated for shock and kept as quiet as possible until medical aid can be obtained.

FAINTING

This results from diminution of blood in the brain, due to many causes. The person gets paler and paler, there is a sinking feeling, and he falls unconscious. This often can be prevented by placing

the patient in a chair with his head forward between his legs, lower than his hips. But after its occurrence, the patient should be laid flat on his back with head low; loosen clothes and give plenty of fresh air; a little ammonia held under the nose will often revive him. After recovery, give whisky or aromatic spirit of ammonia.

EPILEPTIC FITS

The patient usually utters a cry, falls suddenly unconscious, has convulsions, foams at the mouth, and bites his tongue. After convulsions cease, he passes into a deep sleep and remains in that state for several hours.

During the convulsions, the only thing to do is to try to prevent him from hurting himself. Something suitable (a piece of wood or cork covered with a handkerchief) should be put between his back teeth to keep his mouth open so he cannot bite his tongue, taking care that it does not fall down his throat. When consciousness has completely returned, a cathartic may be given, because in those subject to epilepsy clogging up of the bowels often brings on an attack. If some time must elapse before medical aid can be obtained or the epileptic discharged, give one tablet of phenobarbital ($1\frac{1}{2}$ grains) three times a day. The tablet should be crushed or chewed and taken with a half tumbler of water. A man known to have fits should not be retained aboard ship. He is unfit for the service and may injure himself seriously by falling down a hatchway or into the machinery, etc.

RESUSCITATION

RESUSCITATION OF THE APPARENTLY DROWNED

The indications in treating one apparently drowned are to remove the water from the upper air passages, to make the patient breathe, and to stimulate the weak heart. Every minute and second counts, so waste no time. Have bystanders move away to give the victim all the air possible. Loosen clothing about neck, chest, and abdomen. Gently swab out the mouth and throat to remove mud, mucus, or other material. Turn the patient over, face downward, place the hands under the abdomen, one on either side, and lift the patient, in an endeavor to drain the lungs and stomach, then with a large roll of clothing under the abdomen, and by making firm pressure upon the loins, continue the efforts to expel the water from the lungs and stomach. If the individual then does not breathe, proceed immediately with artificial respiration. It is well at the same time to try to stimulate respiration by having an assistant hold ammonia or smelling salts to the nostrils.

Artificial Respiration.—No reliance should be placed upon any special mechanical apparatus, as it is frequently out of order and



FIGURE 1.



FIGURE 2.



FIGURE 3.

often is not available when most needed. The patient's mouth should be cleared of any obstruction such as chewing gum or tobacco, false teeth, or mucus so that there is no interference with the entrance and escape of air. *TO KEEP THE PATIENT WARM DURING ARTIFICIAL RESPIRATION IS MOST IMPORTANT AND IT MAY BE NECESSARY TO COVER HIM WITH BLANKETS AND WORK THROUGH THEM, AS WELL AS TO APPLY HOT-WATER BOTTLES, HOT BRICKS, ETC.*

There are several accepted methods of applying artificial respiration but the best and probably the least dangerous is the prone pressure or *Schaefer's method*, which is as follows:

POSITION

1. Lay the patient on his belly, one arm extended directly overhead, the other arm bent at elbow and with the face turned outward and resting on hand or forearm, so that the nose and mouth are free for breathing. (See Inset fig. 1.)

2. Kneel straddling the patient's thighs with your knees placed at such a distance from the hip bones as will allow you to assume the position shown in Figure 1.

Place the palms of the hands on the small of the back with fingers resting on the ribs, the little finger just touching the lowest rib, with the thumb and fingers in a natural position, and the tips of the fingers just out of sight. (See fig. 1.)

FIRST MOVEMENT

3. With the arms held straight, swing forward slowly, so that the weight of your body is gradually brought to bear upon the patient. The shoulder should be directly over the heel of the hand at the end of the forward swing. (See fig. 2.) Do not bend your elbows. This operation should take about two seconds.

SECOND MOVEMENT

4. Now immediately swing backward, so as to remove the pressure completely. (See fig. 3.)

5. After two seconds, swing forward again. Thus repeat deliberately twelve to fifteen times a minute the double movement of compression and release, a complete respiration in four or five seconds.

Continued artificial respiration without interruption until natural breathing is restored. Do not get discouraged at the slow results that sometimes happen when resuscitating the apparently drowned. Efforts often have to be continued a long time before signs of life are apparent. Do not discontinue the efforts until certain that all

chance is lost. Sometimes, even after several hours' work, recovery takes place.

Do not give any liquids whatever by mouth until the patient is fully conscious.

To avoid strain on the heart when the patient revives, he should be kept lying down and not allowed to stand or sit up. Give some stimulant, such as one teaspoonful of aromatic spirits of ammonia in a small glass of water or a hot drink of coffee or tea, etc. Continue to keep the patient warm and at rest.

As a general rule he should not be moved until he is breathing normally of his own volition and then moved only in a lying position. Should it be necessary, due to extreme weather conditions, etc., to move the patient before he is breathing normally, resuscitation should be carried on during the time that he is being moved.

A brief return of natural respiration is not a certain indication for stopping the resuscitation. Not infrequently the patient, after a temporary recovery of respiration, stops breathing again. The patient must be watched, and if natural breathing stops, artificial respiration should be resumed at once.

In carrying out resuscitation it may be necessary to change the operator. This change must be made without losing the rhythm of respiration. The relief operator should kneel behind the one giving the artificial respiration and at the end of the movement, the operator crawls forward while the relief takes his place. By this procedure no confusion results at the time of change of operator, and a regular rhythm is kept up.

ALTERNATE METHOD

In cases of injuries of the back, such as burns, lacerations and blisters of the skin, which would interfere with the Schaefer method of resuscitation, as an alternative the Sylvester method can be employed.

Sylvester method.—(Note that the mouth and throat are clear of foreign objects and tongue is pulled well forward.)

1. Place patient on back, with head turned slightly to one side.
2. Kneeling in back of head, grasp wrists (or forearms if wrists are injured) and pull arms back, fully extended.
3. Bending trunk forward from hips, return arms to chest, placing hands of patient on both sides of chest on top of the lowest ribs, and apply sufficient pressure with arms and trunk to expel air from lungs.
4. Re-extend arms to back of head; return arms to chest position and apply pressure alternately, 14 to 16 times per minute. Otherwise follow the details of resuscitation previously explained.

In order to prevent drowning, every person should learn the art of swimming and how to keep afloat for a sufficient length of time to allow assistance to effect rescue. In rescuing a drowning person, the rescuer himself should be a fairly strong swimmer and have a knowledge of the different conditions that he will have to encounter. If possible, he should remove most of his clothes, especially the shoes. He should reassure the drowning man that help is at hand and approach him from the rear. To prevent being seized himself, the rescuer should dive, seize the drowning man by both hips, then by both sides of the chest, by both shoulders and finally as he emerges place one arm around his neck with the bend of the elbow in front of his throat. With the man held firmly on his side the rescuer swims for the shore or until a boat or other assistance comes to him. If the drowning person struggles, it may be necessary to render him unconscious by a blow in the face before he can be handled.

Artificial respiration may also be required for persons asphyxiated by gases, fumes, or noxious vapors, and anesthetics, electric shock, shock or collapse, freezing or exposure to extremes of heat or cold, cases of poisoning, etc. In other words, in all cases in which breathing is temporarily suspended, artificial respiration is indicated.

RESUSCITATION FROM GAS FUMES

In treating this condition the patient needs plenty of fresh air. Artificial respiration as described under drowning should be started at once. Stimulants and rubbing are helpful. Oxygen, if available, should be administered with a face mask or from a rubber tube held in front of the nose. (See also p. 37.)

RESUSCITATION FROM ELECTRIC SHOCK .

A person accidentally shocked by electricity is not necessarily killed. He may be only stunned or the breathing be stopped momentarily. The following instructions should be followed:

1. Break the circuit immediately.
2. Separate the victim from the live conductor by quick motion, using some nonconductor, as dry rope, dry coat, or dry board. The victim's clothes, if dry, may be used to pull him from the live wire. Use nothing wet or metallic.
3. Beware of touching the heels or soles of his shoes.
4. Do not touch his body with the hands unless they are covered with rubber gloves, mackintosh, dry clothing, or other nonconductor material.
5. If necessary to cut a live wire, use an ax or hatchet with a dry wooden handle, or insulated pliers.

After removing patient from wire, institute artificial respiration

by the Schaefer method. Attend to the burns as described under treatment for burns. Apply warmth to body, rub skin and muscles, and give stimulants if patient can swallow.

POISONS

Prevention.—Keep all poisonous drugs and solutions locked up. Label all bottles with their contents and a **Poison** label. See that all bottles are properly labeled and no drug is put in them that does not belong there.

In treating patients for poisoning the indications are:

1. To neutralize the poison (give antidote).
2. To get rid of the poison from the stomach (produce vomiting and preserve material for chemical examination).
3. To prevent further absorption into the system of the poison that may have remained in the stomach (oils, etc., except in case of phosphorus poisoning).
4. To cause elimination from the system of the poison that may already have been absorbed (large drafts of water, purgatives, etc.).
5. In case of collapse, to sustain and support the body strength (by stimulants, external application of heat, etc.).

Unknown poison.—Produce vomiting. This can be done by giving 2 teaspoonfuls of mustard in a cup of warm water; can also be induced by 2 teaspoonfuls of common salt in a cup of warm water; soapsuds; encourage patient to put fingers down throat. Syrup of ipecac, 1 tablespoonful in cup of tepid water, is also a good emetic. After vomiting, give whites of raw eggs, or milk, or flour in water. If signs of collapse are present, give hot tea, coffee, and other stimulants. Keep the body warm and rub the extremities.

Bichloride of mercury.—Give whites of two raw eggs. If these are not on hand give milk, or raw meat chopped finely in water or milk, or give soap and water. Then cause vomiting and later give strong tea, flour in water, flaxseed tea, or barley water. Keep the patient warm, and, if stimulants are necessary, give strong coffee. Cases must be treated with as much haste as a severed artery.

Strong metallic acid (as nitric, sulfuric, hydrochloric, etc.).—Give no emetic. Neutralize the poison by giving alkalies, such as large quantities of water, milk of magnesia, or milk with borax, chalk, or limewater (plaster). Baking soda and soapsuds may be given to neutralize hydrochloric acid only. Follow with olive oil or other demulcent drinks as for carbolic acid. Place patient in recumbent position and keep body warm. Give aromatic spirit of ammonia and other stimulants.

Carbolic acid (Cresol, phenol).—The treatment indicated is to immediately give a strong solution of Epsom salt in warm water and

induce vomiting by giving mustard and water, salt and water, or putting fingers down throat. Then give demulcent drinks such as milk, flour in water, egg whites, flaxseed tea, or barley water, followed by hot tea, strong coffee, or other stimulants. Keep body warm. Alcohol may be used for local burns. If breathing stops, apply artificial respiration.

Alkalies (lye, etc.).—The treatment indicated is to give mild acids, such as vinegar, lemon or orange juice, hard cider. Whites of eggs may be given later, then give something soothing, such as oil, gruel, barley water, milk, butter, or lard. Place patient on back; apply heat externally; fresh air; strong coffee or other stimulants.

Opium, laudanum, paregoric, heroin, morphine.—Give an emetic. The best emetic in this case is mustard and hot water. Something irritating is needed to start vomiting, as the nerves of the stomach are dulled by the opium. Give strong tea or coffee, if patient is unable to swallow, inject into bowel. Keep patient awake by applying cold water to head and face, slapping him with wet towel, and walking him about, but do not exhaust patient by overdoing this. Give no wines or liquors. When respiration is slow and irregular, apply artificial respiration.

Arsenic, Paris green, rough on rats.—The best antidote, if it can be obtained, is two teaspoonfuls of magnesia, one tablespoonful of tincture of iron in a cup of water; take as one dose. Give an emetic; the whites of raw eggs and a large amount of greasy or salty water may be given. Lime water, or plaster in water may be given. Later gruel, sweet oil, starch and water, and castor oil (1 ounce) may be given.

Strychnine (nux vomica).—Give strong tea, then administer an emetic until free vomiting is induced. Give Epsom salt. Apply artificial respiration if necessary. Remove patient to a dark room, keep quiet, avoid sudden noises. Give phenobarbital to control spasms to the limit indicated under that drug.

Trinitrotoluene (TNT) poisoning.—Because of the extensive use of this substance on board ships and in naval magazines ashore, poisoning caused by it is not uncommon.

The poison may be removed from the skin with a solution of sodium hyposulfite. Remove the patient from the vicinity of the substance, provide absolute rest, fresh air, and simple diet. Large amounts of water with large doses of sodium citrate and sodium bicarbonate should be given. Restrict the meat intake, give small doses of iron daily, and regulate the bowels.

Gasoline, benzine, wood alcohol and naphtha poisoning.—This usually results from inhalation of fumes or accidental swallowing in siphoning, etc. Symptoms from the ingestion of gasoline resemble

those caused by acute alcoholism, the patient is very apt to develop mania and later become unconscious.

Remove the patient to the open air, remove all gasoline, benzine, or naphtha-soaked clothing, apply external heat if necessary. Administer stimulants and treat as for carbon-monoxide poisoning.

Carbon monoxide.—Most frequently results from exposure to exhaust fumes of gasoline motors particularly in confined spaces and after entering airtight compartments closed for some time. (See section on ventilation.)

The treatment indicated is: (1) Remove the patient from atmosphere containing monoxide; (2) administer oxygen as quickly as possible and in as pure a form as is obtainable, preferably from a cylinder of oxygen through an inhaler mask; (3) if breathing is feeble, start artificial respiration at once by prone-pressure method; (4) keep the patient flat, quiet, and warm; (5) afterward give plenty of rest.

Chloral hydrate ("knock out" drops).—Overdose renders person suddenly helpless. Symptoms start with burning sensation in throat, nausea, vomiting and pain in stomach. Later, patient becomes cold, relaxed, comatose and blue. May die from paralysis of the respiratory center.

The stomach should be emptied by an emetic, patient kept warm and artificial respiration administered if necessary. Strong black coffee is valuable as a stimulant, if patient is conscious and stomach has been evacuated.

Barbital (veronal), luminal, nembutal, sulphonal, etc.—The symptoms of poisoning are headache, mental confusion, staggering gait, difficult breathing, stupor and coma. There may be skin eruptions and paralysis of various types.

Vomiting should be induced. Stimulation and artificial respiration should be used according to need.

Iodine.—Poisoning may be caused when the Tincture of Iodine is applied too heavily or when swallowed. The vapor is irritating to the eyes and respiratory system. When swallowed, the mouth and lips are corroded and stained and there is pain, thirst, vomiting, suppression of urine, diarrhea, and collapse.

Administer starch in water, freely; induce vomiting, apply external heat and establish absolute rest.

CHEMICAL WARFARE AGENTS

Emergency Treatment of Cases Caused by Common Gases

General Rules.—The sooner first-aid treatment is administered, the greater are the chances of early recovery. **THERE MUST BE NO DELAY—QUICK ACTION IS PARAMOUNT.**

Each chemical produces certain damaging effects which require special treatment. Certain general principles are applicable to all, which, if carried out as soon as possible, will give relief. These include (a) fresh air, (b) rest, (c) warmth, (d) careful handling, and (e) removal and neutralization of chemical.

The elementary phases of first aid in applying the above general principles are:

1. Remove patient immediately from the gas-contaminated area to a pure fresh atmosphere.

2. Remove all gas-contaminated clothing and equipment as soon as possible.

3. Remove the chemical from the exposed parts of the body with water. It is important to keep parts of the body burned with *phosphorus* particles COVERED WITH WATER if possible. An extremity may be immersed. A wet dressing may be used where it is impracticable to immerse the part of the body in water.

NOTE.—2 percent copper sulphate should be applied as a wet dressing if available.

4. Cover patient with clean blankets to keep warm.

5. If the casual has inhaled large quantities of *phosgene*, *chloropicrin*, *chlorine* or any other lung-irritant gas (including the "vesicant" gases—*mustard* and *lewisite*), KEEP PATIENT IN RECLINING POSITION AND DO NOT PERMIT TALKING, SMOKING, OR EXERTION. If patients become "blue" and respirations are labored and difficult, artificial respiration in fresh air should be carried out. If available, oxygen should be administered. A rubber tube from an oxygen tank may be put under a hat or cap placed over the face, and a small amount of gas allowed to flow from the tube, mixing with the air in front of the face.

6. Transfer casualties as quickly as possible to hospital, or hospital ship, where proper medical attention can be given.

7. In cases exposed to "lacrimator" (tear) gas (*chloro-acetophenone* and *bromobenzylcyanide*) the effects will ordinarily disappear after exposure to fresh air.

Chapter III

SPECIAL DISEASES

COMMUNICABLE DISEASES

In this chapter will be discussed the symptoms, treatment, and methods for control of a number of diseases that may occur on board ship.

Communicable diseases are caused by animal and plant microorganisms which are communicated by man to man or by animals or insects to man. A person suffering with a communicable disease is said to be infected with that disease and for that reason the communicable diseases are often termed infectious diseases, and sometimes as infectious fevers.

In general, the communicable diseases are usually sudden in onset and may be classified as general infections which affect the body as a whole or as localized infections which primarily affect some particular system of the body, such as the skin, the lungs and respiratory passages, or the digestive organs.

Those diseases which affect the body as a whole are characterized by generalized symptoms, such as headache, fever, weakness, loss of appetite, chills, or a chilly sensation, and muscle aches and pains. Frequently these may be accompanied or followed by symptoms of a local nature such as sore throat, cough, or a skin rash.

Diseases which chiefly affect some particular system of the body usually also cause some generalized symptoms, such as those mentioned above, in addition to the localized symptoms of the infection. The differentiation between these two types of diseases depends upon whether the symptoms are predominantly general or local. In the course of an illness its type may change. For instance, an attack of influenza may localize as a pneumonia or an infected wound may develop into a general septicemia, commonly called blood poisoning.

Only by careful search for symptoms and observations of these symptoms during the progress of the illness can the correct diagnosis be made and the proper treatment be given.

The season of the year, the geographical location, and the environmental conditions are also factors to be considered in the diagnosis of an illness. For instance, dengue, malaria, and yellow fever are diseases transmitted by certain species of mosquitos. Consequently,

these diseases may be found where mosquitos harboring these diseases are prevalent. Cholera, dysentery, and typhoid fever are associated with defective sewage disposal and contaminated food and water supply. Typhus fever and plague are transmitted by fleas, lice, and ticks which are prevalent under conditions of crowding with poor bathing and washing facilities.

When the body is invaded by the microorganisms of a disease there is a general disturbance of the health which is usually accompanied by a rise in the heat, or temperature, of the body that is known as fever. There are three common types of fever known as continuous, remittent, and intermittent.

A *continuous fever* is one in which the temperature is continuously elevated during each 24 hours and it does not come down to normal. The fever accompanying pneumonia belongs to this type.

In a *remittent fever* the temperature varies from high to low but does reach normal during each 24 hours. The highest point is usually reached in the evening, the lowest in the morning. Typhoid fever is an example of this type.

In an *intermittent fever* there is a great range between the highest and lowest points of temperature in 24 hours. It may rise suddenly to 104° or 105° F. and as suddenly fall, to normal or below. A typical example of this type is malarial fever.

The termination of fevers occurs in one of two ways: By *crisis*, when it drops suddenly to normal or below, never again rising to any considerable extent unless there is a relapse or a complication sets in, or by *lysis*, when it gradually comes down to normal. Pneumonia, influenza, measles, and typhus fever are examples of diseases in which the fever terminates by crisis, most other fevers terminating by lysis.

Body temperature is measured by means of the clinical thermometer, a small glass cylinder, the center of which is a slender hollow tube dilated at its lower end into an oblong or round bulb and containing mercury. When heat is applied to the bulb the mercury expands and is forced as a silvery, thread-like line to a height in the tube depending on the amount of heat applied to the base. The front aspect of the glass tube is conical which, by the refraction of light, magnifies or broadens the image of the mercury column so that it is easily seen. On the tube is a scale which, in this country, is usually marked in degrees and tenths of degrees Fahrenheit, and ranges from 92° to 110°. To read the temperature the conical edge of the tube is held toward the reader, the thermometer is rotated slightly in the fingers until the flash of the magnified metallic column is seen, and then held in that position while the degree on the scale at the top of the column is read.

A special marking on the scale indicates the normal degree of temperature, 98.6° F., and one should be familiar with its location. Before taking the temperature the mercury in the thermometer should always be below that mark, usually at about 95° F. To get the mercury below the normal mark hold the upper end of the thermometer firmly, but not stiffly, between the thumb and the first and second fingers of the hand, and, with the wrist relaxed, shake the mercury down by quick swings repeated as long as necessary.

Temperature taken by mouth is considered as the standard, but it may also be taken by rectum or in the armpit. When taken by rectum it is roughly 1° higher and in the armpit 1° lower than when taken by mouth. The thermometer should be left in the mouth about 3 minutes, in the rectum for 3 to 5 minutes, and in the armpit for 5 to 7 minutes before reading.

In taking temperature by mouth the thermometer is placed in a slanting position in the mouth with the bulb under the tongue and the tube against the corner of the mouth, and the lips kept closed.

After use clean the thermometer in cold water (hot water will break it), immerse it for 20 minutes in 1-20 solution of carbolic acid, rinse in cold water and dry.

Before considering the communicable diseases separately it is necessary that certain matters pertaining to and terms employed in dealing with them be briefly discussed.

A *rash* is a temporary eruption that appears on the surface of the skin. It occurs in the following communicable diseases: Measles, German measles, chicken pox, scarlet fever, smallpox, cerebrospinal fever, typhoid fever, and typhus fever. In each of these diseases, the character of the rash and the time of its appearance are very important factors in making the diagnosis. In describing a rash the following terms are used:

A *papule* (or pimple) is a small, red, solid elevation of the skin.

A *macule* is a small spot of congested skin; it is larger and flatter than a papule. It is not elevated above the skin.

A *vesicle* is a small collection of serum under the skin; e. g., a water blister.

A *bulla* or *bleb* is a large blister.

A *pustule* is a small collection of pus under the skin, or an infected papule.

A *scab* is an irregular mass of dried serum or pus, usually brown in color.

A *scale* is a particle of dried skin that peels off.

CONTROL OF COMMUNICABLE DISEASES

In dealing with communicable or infectious diseases certain terms are frequently used and a few of them will be next explained.

Cleaning.—This term signifies the removal by scrubbing and washing, as with hot water, soap, and washing soda, of organic matter on which and in which germs may find favorable conditions for living; also the removal, by the same means, of germs adherent to surfaces.

Contact.—A “contact” is any person or animal known to have been sufficiently near to an infected person or animal to have been presumably exposed to the transfer of infectious material directly or by articles freshly soiled with such material.

Incubation period.—This is the period of time which elapses between the date of infection with a communicable disease and the appearance of the first symptoms of the disease. During this period the germs of the disease are growing and multiplying in the body.

Isolation.—This is the period of time during which a patient suffering with a communicable disease is kept by himself and separated from others in order to prevent the conveyance of infectious material to them.

Quarantine.—This is the time during which the freedom of movement of apparently healthy persons who have been exposed to communicable diseases is restricted and they are kept under observation to see if they develop the disease to which they have been exposed. The period of quarantine is generally 2 or 3 days longer than the incubation period. This term is also applied to animals and plants.

SPREAD OF INFECTION

The infection of communicable diseases is spread or transmitted in various ways—by actual contact, by the air (droplets of saliva or germ-carrying dust), food, or drink, clothing, books, utensils, insects, etc. The most infectious part of a patient may be discharges from the mouth, throat, nose, or ears, the urine, or the feces.

PREVENTION OF SPREAD OF INFECTION

1. *Isolation.*—As soon as a case is suspected of being infectious the patient should be kept away from other persons. On board ship any suitable place may be employed, such as a spare cabin, chain locker, a boat roofed over with tarpaulin, any compartment which can be afterwards thoroughly disinfected and where the individual will not come in contact with the rest of the crew. The patient

should be sent to a hospital as soon as the proper authority has been obtained from the quarantine officer of the port or other person authorized to land him. The person detailed to attend an infectious case must not mingle with other people. The patient must have his own separate utensils—cup, plate, knife, fork, spoon, etc., and use a commode and urinal instead of the general head. Isolation must be complete, so that there is no possible way by which infection can be carried to others.

2. *Disinfection*.—By disinfection is meant the killing of the germs of the disease. This is carried out by heat, by chemicals, or by fresh air and sunlight.

Disinfection by heat: Boiling in water is the best and surest method of disinfection, but it cannot, of course, be used for every infected article. For bedding and clothing a steam disinfector is used. Habitual disinfection of the mess gear of all the crew by boiling water should be meticulously observed after each meal and particularly upon the appearance of a communicable disease. (See also chapter on Quarantine and Disinfection; and instructions under specific diseases.)

3. *Disinfesting*.—By disinfesting is meant any process, such as the use of dry or moist heat, gaseous agents, poisoned food, trapping, etc., by which insects and animals known to be capable of conveying or transmitting infection may be destroyed.

4. *Fumigation*.—By fumigation is meant a process by which the destruction of insects, as mosquitoes and body lice, and of animals, as rats, is accomplished by the employment of gaseous agents.

TREATMENT OF COMMUNICABLE DISEASES

The fundamental principles of the treatment of communicable diseases are:

Rest.—Should be actual rest, in a comfortable bed, placed in a quiet, well-ventilated compartment, and every means exercised to relieve the patient from anxiety and concern, and to promote sleep.

Diet.—Should be liquid or semisolid, such as milk, raw or soft-boiled eggs, tapioca, cornstarch; chicken, beef, or mutton broths seasoned and thickened with rice. Food should not be urged, in the early hours or days of a disease, against the patient's disinclination to take food. However, when the patient has lost his aversion for food, it should be appreciated and the appetite catered to as far as may be consistently done, keeping in mind the general diet of liquids or semisolids as given before. Water, or such drinks as lemonade, limeade, orangeade, or carbonated water should be given frequently and offered to the patient, not waiting for his request,

because frequently there is a mild delirium, and the patient's state of mind will not cause him to ask for water though he needs it in abundance to keep the bowels and kidneys and skin active.

Fresh air.—Means of supplying abundant fresh air, preferably cold air, should be provided. If practicable, all cases of fever should be treated in the open air on deck, but if the weather is particularly cold, the patient should be kept warm, covering the bed clothing with a rubber blanket and all tucked well in under the mattress to prevent the cold air getting under the bed clothing; a hot-water bottle placed at the feet gives great comfort in treating the patient in the open.

Hydrotherapy.—Tepid sponge baths may be given once a day at evening to bring down a temperature if high, and to add to the comfort of the patient.

Drugs.—Aspirin in 5-grain doses may be given during a fever or for the relief of headaches and muscular pains.

Careful nursing is an essential in the treatment of all disease; and while it is not to be expected that the nursing available on board ships to which no member of the medical department is attached, will be as efficient as that which may be had from persons trained in the art of nursing, much may be done to aid the sick if attention is given to providing for their wants and promoting their comfort. A sick man should have a man detailed to wait on him and watch him. This makes rest possible for the patient. Fever patients often get delirious, and if not watched, may injure themselves, jump overboard, etc.

Keeping the patient's face, hands, and body clean and the nose and mouth clear and moistened (a little glycerine and water, to which may be added a little lemon juice or a small pinch of soda, is useful to wet the lips, tongue, and inside of cheeks) makes him feel fresher and renders him better able to combat the germs and toxins of disease.

INSTRUCTIONS FOR THE PERSON NURSING A COMMUNICABLE-DISEASE PATIENT

1. Wash your hands as soon as possible after touching the patient, his clothing, or bedding, also after handling the bedpan, urinal, thermometer, etc.
2. Wash your hands carefully before eating your meals.
3. Never use cups, plates, spoons, knives, forks, etc., which have been used by the patient. Keep your own utensils in a separate place so that you will know that you are always using the same articles.
4. See that your patient does not come in contact with the other people of the ship.
5. On no account are you yourself allowed to mingle with others of the crew, etc.
6. Never eat your meals with the patient.
7. Wear white clothes, as these can be washed and boiled more easily.

GENERAL INFECTIONS

INFLUENZA (GRIP)

SYMPTOMS.—Incubation period—short, usually 24 to 72 hours. The onset is fairly sudden with fever and signs of a bad cold, but the patient feels much more ill than with an ordinary cold, and has severe prostration and pains in the back, limbs, and head. In some forms, the lungs are mostly affected and pneumonia or bronchitis may complicate the disease. In others, the heart may suffer, causing palpitation and difficult breathing; while in others, again, diarrhea and vomiting may be the chief symptoms. The acute illness lasts about a week but convalescence may be very prolonged and complicated.

TREATMENT.—In the beginning of the disease a laxative may be given if the patient is constipated. Keep the patient in bed and force fluids by mouth. Give 5 grains of Dover's powder at night. If the headache and pain in the limbs and back continue and are severe, give aspirin, 5 grains every 3 hours. Do not continue this treatment more than 2 days. Coryza tablets may be given after Dover's powder if there is much secretion in the nose, throat, or chest, and followed by aspirin. For sore throat, use one of the gargles described under scarlet fever.

METHODS OF CONTROL—Isolation.—During acute stage of the disease, especially in severe cases and those complicated by pneumonia.

Quarantine.—None, but visiting the patient should be discouraged.

General measures.—Disinfect discharges from the nose and throat of the patient. Avoid crowds and crowding of beds.

CHICKENPOX

SYMPTOMS.—Incubation period—2 to 3 weeks. The rash appears on the first day of the illness and consists of vesicles, which dry and form scabs. The vesicles come out in crops, mostly on the trunk, face, and scalp and only a few on the limbs. There is usually very slight fever, and the patient does not feel very ill. The vesicles may be so few as to escape observation.

TREATMENT.—Put to bed if there is fever, otherwise not necessary. No change of diet unless there is fever, then exclude solids. Give water freely. For itching, wash parts gently with a solution of sodium bicarbonate, 1 tablespoonful to a pint of water. Keep mouth clean with alkaline and aromatic solution. Keep bowels open with Epsom salt.

METHODS OF CONTROL—Isolation.—Avoidance of contact with non-immune persons should be made effective.

Quarantine.—None. Contacts should be observed daily for a period of 24 days.

General measures.—Disinfection of articles soiled by discharges from lesions. Investigate source of infection (may be mistaken for smallpox). Thorough cleaning of compartment after recovery or removal of patient.

SMALLPOX

SYMPTOMS.—Incubation period—8 to 16 days, commonly 12 days. The beginning is sudden with a chill, headache, and pain in the back. The headache and backache are very severe and quite characteristic. The temperature may rise rapidly to 103° or 104° F. The eruption appears 1 to 5 days after the onset of fever on the forehead, scalp, forearms, legs, and trunk. At first the eruption consists of papules which are small and red and feel like shot under the skin. About the sixth day, the papules become vesicles; about the eighth day, pustules, and about the tenth day scabs form, which in time fall off, leaving, finally, deep white pitted scars. When the papules appear, the temperature falls but rises again when the pustules are forming. The patient's skin has usually a very foul odor. The severity of the disease may vary from a mild form, with a few discrete pustules, to a severe form with hemorrhages into the skin, which is fatal in 1 to 2 days.

TREATMENT.—The body may be sponged twice daily with warm water or warm baths given when the patient is strong enough. The mouth must be kept clean and the eyes washed with borax eye solution. (See Diseases of the Eye.) The eruption should usually be covered with some oily dressing, such as vaseline, or with cold-water compresses covered with oiled silk or muslin. An arrangement to relieve the patient of the weight of bedclothes is often necessary. Feeding may become difficult, owing to the condition of the mouth. Delirium is common and the patient must be carefully watched. Report the suspected case by radio if possible.

METHODS OF CONTROL.—*Isolation.*—Strict isolation until the period of infectivity (disappearance of all scabs and crusts), is passed.

Quarantine.—Until vaccinated and height of take has passed, otherwise 16 days.

General measures.—Disinfection of all articles before leaving surroundings of patient. Thorough cleaning and disinfection of compartment after recovery or removal of patient. In all cases of smallpox, every effort should be made to obtain medical assistance and the earliest vaccination of all members of the crew, regardless of exposure, is necessary. Investigate the source of infection as many cases of chicken pox are mistaken for smallpox.

MEASLES

SYMPTOMS.—Incubation period—8 to 14 days. The disease commences like a common cold, with sneezing, running at the eyes and nose, headache, cough, and slight fever. On the fourth day the rash appears on the face and thence spreads downward to the neck, chest, abdomen, and limbs. It consists of dull, red macules which run together, forming various patterns and lasts about 3 days. The lining of the mouth and throat appears of the same bright red color, dotted by minute white spots which appear before the skin eruption and are diagnostic of measles. The temperature falls at the end of the fifth day and the symptoms disappear, but the cough may remain for some time.

TREATMENT.—Along general lines. Guard against chilling, as the complications, bronchitis and pneumonia, may prove fatal.

METHODS OF CONTROL.—*Isolation.*—During period of communicability, a minimum period of 9 days: from 4 days before to 5 days after the appearance of the rash.

Quarantine.—7 days.

General measures.—Disinfection of all articles which have been in contact with patient and all articles soiled by his discharges. Thorough cleaning of compartment after recovery or removal of patient. Investigation of source of infection (carrier). Immunization of exposed susceptibles when possible.

GERMAN MEASLES

SYMPTOMS.—Incubation period—14 to 21 days, usually about 16 days. These symptoms are usually very mild, consisting of sore throat, headache, very mild fever, lasting only a day or two, and enlargement of the glands of the neck. The rash appears on the third or fourth day on the face and chest, spreading to the trunk and limbs; consists of red papules larger and duller than in scarlet fever, smaller and brighter than in measles, and lasts about two days.

TREATMENT.—Along general lines. Beyond keeping the patient isolated for a few days and avoiding a chill, no treatment is usually necessary.

METHODS OF CONTROL.—*Isolation.*—Of no practical value.

Quarantine.—None.

General Measures.—Disinfection of discharges from nose and throat of patient and articles soiled by discharges. Airing and cleaning of compartment after recovery or removal of patient. Investigate source of infection (may be mistaken for scarlet fever in early stages).

SCARLET FEVER

SYMPTOMS.—Incubation period—2 to 7 days, usually 3 to 4 days. Symptoms come on suddenly, the most marked being fever and sore throat with nausea and vomiting. The rash appears on the second or third day and consists of bright red papules set very close together, which gives the skin its scarlet hue. It is seen first on the neck and then spreads to the chest, arms, abdomen, and legs. It is usually most marked on the neck, the flanks, the buttocks, the bend of the elbows, and on the inner side of the thighs and knees, but may not appear on the face in mild cases. It usually lasts about 5 days. The throat remains sore for some days, the tonsils are red and swollen and often covered with yellow patches. The tongue is at first covered with white fur through which the red papillae show, giving it the appearance of a strawberry. Later when the fur disappears, the tongue becomes very red. The fever is usually high and lasts about a week and may cause some flushing of the face, which must not be mistaken for the rash. Desquamation, or peeling of the skin, commences as the rash disappears and is first noticed on those parts of the body where the rash was most marked. It commences as small white spots in the center of which holes appear. From this center, circular scales separate. This pinhole peeling is characteristic of scarlet fever. The scales may be small or may come away in large flakes. The last parts to peel are the palms of the hands and the soles of the feet.

TREATMENT.—The patient should be kept in bed even in the mildest cases on account of possible inflammation of the kidneys, which is the most serious complication of this disease. The body may be sponged daily during the fever with warm water in a warm room, under a blanket, exposing one part of the body after another. The diet should be restricted to milk, giving two quarts a day during the fever. If milk is not available, gruels made from cereals, arrowroot, cornstarch, barley flour, or tapioca may be substituted. Feed at two-hour intervals but do not interrupt sleep at night. Water, lemonade, orangeade, limeade, etc., sweetened, should be given freely. Soft food should be given during convalescence. Particular care should be given to the nose and mouth and they should be frequently cleansed with salt solution (1 teaspoonful of common salt dissolved in a pint of tepid water), or alkaline and aromatic solution. The patient should be under treatment for 6 or 7 weeks, or until peeling is completed. The case, of course, should come to the attention of a medical officer as soon as possible. To relieve the pain of the sore throat, apply the ice bag or cloths wrung out

in cold water to the neck and have the patient gargle with alkaline and aromatic solution, dissolving four of the tablets in a pint of warm water, or dissolve a half teaspoonful of soda bicarbonate, or a teaspoonful of table salt in a tumbler of hot water and use as gargle. To allay itching and when the skin commences to peel, the patient may be rubbed with olive oil or a simple ointment to prevent the scales floating about, or a daily hot bath may be given. The infection is most potent in the secretions of the nose and throat during the first 5 days of the disease.

METHODS OF CONTROL.—*Isolation.*—If medical inspection is not available, isolation for 21 days from onset for uncomplicated cases.

Quarantine.—7 days.

General measures.—Disinfection of all articles which have been in contact with patient and all articles soiled by his discharges. Thorough cleaning of compartment after recovery or removal of patient. Investigation of source of infection (carrier).

MUMPS

SYMPTOMS.—Incubation period—12 to 26 days, most commonly 18 days. The patient complains of pain and stiffness on moving the lower jaw, and there will be swelling of one or more of the salivary glands. His temperature is raised, often to 104° F. The fever lasts about a week and the swelling about 10 days. Orchitis, or inflammation of the testicles, is very liable to occur in about 25 percent of cases at the end of the first week. The temperature rises rapidly and the testicle is found to be painful, tender, and swollen. This condition does not usually last more than a week but is very painful and usually results in atrophy of the affected testicle, and possible sterility, if both are affected.

TREATMENT.—Along general lines. Isolate the patient, keep the bowels well open, and for the pain, hot water bags may be used applied to the swelling. Strict bed treatment and avoidance of exercise and chilling is absolutely necessary to avoid complications. If orchitis occurs the testicles should be supported by a suspensory bandage or a broad strip of adhesive plaster, with gauze or cotton between testicles and support, applied across the upper part of the thighs in such a manner that the testicles will be thoroughly supported. The ice bag should be applied to relieve the pain and the bowels freely opened with Epsom salt—2 tablespoonfuls dissolved in water.

METHODS OF CONTROL.—*Isolation.*—3 weeks; 1 week must have elapsed since all swelling has subsided.

Quarantine.—None. All contacts, however, should be inspected daily for a period of 3 weeks from date of last exposure.

General measures.—Disinfect all articles soiled by discharges of nose and throat of patient. Investigate source of infection (e. g., recent cases of swollen jaw or orchitis).

MALARIA

SYMPTOMS.—Incubation period—usually 14 days in the tertian variety. This is a recurrent fever caused by malarial parasites which are carried by certain anopheline mosquitoes and injected into the body when the insects bite. The disease is not infectious except through the bite of a mosquito which has bitten malaria patients or carriers at some time during its life. The disease consists in attacks of fever which recur at regular intervals. Each attack may be divided into three stages: (1) The cold stage: The patient shivers and feels cold when his temperature is rapidly rising. He goes to bed and covers himself with extra blankets. This stage lasts about half an hour. (2) The hot stage: He begins to feel warm and removes most of the bed clothes. The skin feel hot and dry, and he suffers from severe headache. The temperature will now be 105° F. or higher. This stage last 3 or 4 hours. (3) The sweating stage: During this stage the patient perspires freely, the headache and flush disappear, and the temperature returns to normal. This stage lasts about 2 hours. These attacks occur every day, every other day, or every third day, according to the species of malarial parasite with which infected, and each lasts about 6 hours. There are other types of malaria in which the fever is continuous, and somewhat resembles the fever of typhoid. Frequently this type of malaria can be diagnosed only by the aid of a microscope, and therefore requires the attention of a medical officer.

TREATMENT.—During the attack, treat along general lines. Quinine, 10 grains three times a day (total: 30 grains daily), should be given by mouth for a week followed by 10 grains every night upon retiring for 8 weeks.

METHODS OF CONTROL.—*Isolation.*—The individual with malarial parasites in his blood should be protected from the bites of mosquitoes. With the exception of this simple precaution, isolation and quarantine are of no avail.

Quarantine.—None. (See Isolation.)

General measures.—The malarial mosquito bites preferably at dusk or at night, therefore when in malarial countries everyone should sleep under mosquito nets. A dose of quinine, 10 grains every day, tends to prevent the disease and should be given when in ports where malaria is prevalent. Investigation of source of infection. Breeding places should be sought for and larvae and mosquitoes destroyed when and where possible.

DENGUE

SYMPTOMS.—Incubation period—3 to 10 days, most often 5 or 6 days. Sudden onset, intense headache, joint and muscle pains (break-bone fever), and irregular eruption.

TREATMENT.—Along general lines as for influenza.

METHODS OF CONTROL.—*Isolation.*—The patient must be kept in a screened room.

Quarantine.—None.

General measures.—Protection against, and elimination of mosquitoes.

UNDULANT FEVER

SYMPTOMS.—Incubation period—6 to 30 days or more. Onset gradual with irregular fever of prolonged duration; profuse sweating, chilliness, pain in joints and muscles. This disease, also called undulant or Mediterranean fever, is transmitted from infected cattle and goats chiefly through unpasteurized milk or by direct contact with infected animals (including swine) or animal products.

TREATMENT.—On general lines. Patient will probably need prolonged care and should be hospitalized. Give phenacetin, 5-grain tablets, which should be chewed by the patient or crushed, three times a day for headache or high fever, and aspirin for pain.

METHODS OF CONTROL.—*Isolation.*—None.

Quarantine.—None.

General measures.—Pasteurization of milk, whether from cows or goats. Investigation of source of infection.

PLAGUE

See description under "Quarantine." As this disease probably will not be encountered aboard naval vessels and in order to avoid confusion, symptoms and treatment are purposely omitted. It should be remembered that this disease is usually rat-borne. The best means of control, therefore, is by rat surveys and eradication.

YELLOW FEVER

SYMPTOMS.—Incubation period—3 to 6 days, rarely longer. When a susceptible individual is bitten by an infected mosquito, there develops, after the period of incubation, a rapid rise of fever, with marked congestion of the face and severe pains of the back and head. Vomiting, first of mucus and bile, comes on very early. The temperature remains fairly high for 3 or 4 days, but notwithstanding the high temperature, the pulse rate becomes less, and by the third or fourth day will have decreased by 20 to 40 beats from its initial

rate. This is a very important symptom. On the fourth day the temperature falls and the face loses its congested appearance, and it is now that the most characteristic feature of yellow fever appears; namely, jaundice, a yellow discoloration of the skin, mucus membranes, eyeballs and secretions. Vomiting of material resembling coffee grounds is common. This is an important epidemic disease of the West Coast of Africa. There has been no case of the urban type in North or Central America or the West Indies for many years. Outbreaks of the so-called jungle type have occurred in recent years in South America, in Colombia, Brazil, and Bolivia. The virus is contained in the blood of infected patients only during the first 3 days of the disease, and the disease is transmitted by the bite of a mosquito, *Aedes ægypti* formerly known as *Stegomyia fasciata* or *calopus*, which has fed on the blood of an infected person about 12 days previously. As it is important to be able to recognize the mosquito, a brief description of it follows: The insect is almost black and has white bands on its back resembling a lyre or jew's harp, and the legs also have white bands. If deprived of water, the adult insect only lives about 5 days. It is essentially a house mosquito and rarely travels more than 75 feet from the house where it has been feeding, and it is probable that it is brought aboard ships in connection with coaling or provisioning rather than blown aboard by prevailing winds.

TREATMENT.—During the first 3 days of the disease, no nourishment whatever should be given. The patient should be allowed an abundance of fluid, of which the best is Vichy or soda water, unflavored, giving a couple of ounces every 10 minutes, iced or just cool, as the patient prefers. If Vichy is not available, water to which has been added a teaspoonful of sodium bicarbonate (baking soda) to the quart, is a good substitute. It is of vital importance to put the patient to bed and keep him quiet. When vomiting is severe, cracked ice may be of value, or rectal instillations (retention enema) of salt solution. Stimulants every 3 hours should be given if the patient shows signs of collapse. Large quantities of citrus fruit juice may be given throughout the course of the disease. After 3 to 7 days, light foods may be given if the patient's condition will permit. Immediate hospitalization is essential.

METHODS OF CONTROL.—*Isolation.*—Necessary during first 4 days of fever in a mosquito-free room.

Quarantine.—None.

General measures.—Any receptacle, tank, double bottom, or other place where fresh water may be collected should be thoroughly screened and frequently inspected in order to prevent the breeding of mosquitos.

SYSTEMIC DISEASES

DISEASES OF THE RESPIRATORY TRACT

COUGHS AND COLDS

When a person has a cough that lasts more than 2 weeks, even though the symptoms are mild, the case is serious enough to require an examination by a medical officer, which should be done at the first opportunity. A cold often marks the beginning of an acute infectious disease, such as measles, scarlet fever, etc.

SYMPTOMS.—A case of bronchitis or bad cold usually begins with a cough, sometimes starting with an irritation in the throat, which gradually travels down into the lungs. The cough is at first usually dry, but later there is a free discharge from the nose and the cough becomes loose and considerable mucus is raised from the lungs. This sputum may at first be white and later yellowish. With this there will be soreness over the upper and front part of the chest, and if the cough is violent there will be considerable soreness of the muscles between the ribs.

TREATMENT.—Colds may often be headed off, certainly benefited, if at the beginning the patient's bowels are opened with Epsom salt or cathartic pills. After either of these has acted, he is given a hot bath, put to bed, given a drink of hot lemonade, and is covered with blankets until a good perspiration is induced. While in this condition care should be taken not to get the body chilled and make the cold worse. Dover's powder, 5 grains, should be taken on going to bed. Aspirin, coryza tablets or phenacetin may be given the next day.

TONSILLITIS (SORE THROAT)

All cases of tonsillitis and sore throat should be promptly isolated because of the possibility of their being diphtheria, and the consequent probability of an epidemic of that disease should such be the case. Sore throat often accompanies a bad cold and is common where ventilation is imperfect.

SYMPTOMS.—Patient complains of rawness and difficulty in swallowing and the tonsils are swollen and red. There are headaches, general muscular and joint pains, and the fever is often high. Small beads of yellow pus are seen on the red, swollen tonsils, and in some cases abscesses may form. If there is a grayish-white tenacious membrane formed in the throat, which bleeds readily when touched, the case should be regarded as diphtheria and the individual promptly and completely isolated, and a medical officer consulted as soon as possible.

TREATMENT.—Isolate all cases of sore throat. Rest in bed; if constipation is present, open bowels with Epsom salt or cathartic pills, make patient gargle every half hour with alkaline and aromatic solution (made by dissolving four tablets in a pint of warm water) or by gargling with one-half teaspoonful of soda bicarbonate dissolved in a tumbler of hot water. Apply ice bag to the neck, or cold cloths if an ice bag is not available. Give liquid and soft diet; avoid hot and highly seasoned food which will burn and irritate an already inflamed throat. As rheumatism of the joints is a frequent sequel of tonsillitis, it is well to give antirheumatic medication during and for about a week after the attack. Aspirin, 5 to 10 grains three times a day after meals, should be administered, or if this is not available, a pinch of soda bicarbonate in one-half teacupful of water four times a day.

PNEUMONIA

This is an acute infectious disease beginning suddenly with a chill followed by fever, often pain in the chest, usually a cough, with labored and rapid breathing accompanied by an expiratory grunt.

SYMPTOMS.—Incubation period: usually 1 to 3 days, not well determined. Sudden onset as noted. Sputum is usually abundant and frothy, soon becoming tenacious or jelly-like, blood-streaked and later brownish-red.

TREATMENT.—Along general lines as for influenza. Absolute rest in bed with plenty of fresh air. Placing the patient in bed on deck in many cases is a life-saving measure. Hospitalization as soon as possible so that serum and other specific treatment may be administered.

METHODS OF CONTROL.—*Isolation.*—Until sputum diminishes and no longer carries virulent germs.

Quarantine.—None.

General measures.—Avoidance of overcrowding, chilling, and fatigue. Disinfect all articles soiled by nose and throat discharges of patient.

DIPHTHERIA

This is an acute infectious disease characterized by the formation of a membrane in the throat and on the tonsils and soft palate. It is caused by the diphtheria bacillus and all secretions from the nose and mouth are infectious.

SYMPTOMS.—Incubation period—usually 2 to 5 days, occasionally longer. Symptoms come on gradually with general indisposition, sore throat, headache, enlarged glands in neck, and moderate fever. There is a creamy-white deposit formed on the tonsils, which spreads to the uvula and soft palate. This membrane may form on other

adjacent parts and block the breathing tubes, in which case there is great danger of asphyxia. In addition to the symptoms caused by blocking of the air passages by the formation of the membrane, the patient suffers greatly from an overwhelming intoxication due to the formation of a poison by the diphtheria bacillus located in the membrane.

TREATMENT.—Along general lines. The patient should be seen at the earliest possible moment by a medical officer. Keep the patient closely isolated and the throat clean by frequent gargling with warm alkaline and aromatic solution—four tablets dissolved in 1 pint of water, or with the soda bicarbonate solution described under scarlet fever. All secretions from the nose and mouth are very infectious, and these should be particularly taken care of. The attendant may become infected by the patient coughing in his face. To prevent this kind of infection, the attendant should at once wash his mouth out with alkaline and aromatic solution and bathe his eyes with borax eye lotion, or better still, wear a face mask of gauze and goggles in addition, while attending the patient.

METHODS OF CONTROL.—*Isolation.*—Until two cultures from nose and throat are negative, or not less than 16 days, if cultures are not possible.

Quarantine.—12 days.

General measures.—Disinfection of all articles which have been in contact with patient or soiled by his discharges. Thorough disinfection and airing of compartment after recovery or removal of patient. Immunization of susceptible contacts. Investigate source of infection (milk, carriers, and pasteurization of milk supply).

ACUTE ABDOMINAL CONDITIONS

The most common, serious, acute abdominal conditions are acute appendicitis, perforating ulcers of the stomach or duodenum, intestinal obstruction, gallstone colic, kidney stone colic, and poisoning by infected food or by other poisons. Pain and tenderness in the abdomen, general or localized or both, nausea and vomiting, and more or less shock are symptoms common to these conditions. All cases presenting symptoms of abdominal pain or nausea and vomiting, particularly when associated with more or less shock, should be brought under the care of a medical officer as soon as possible.

One always should suspect more than ordinary indigestion or constipation if there is much prostration, shock, or elevated temperature, or if the symptoms persist for any length of time. Many a person suffering from acute appendicitis or obstruction of the bowels will ascribe the condition to something that has been eaten, but do not be deceived by such a statement. Get all the information possible

as to how the attack started, history of previous attacks, and symptoms prior to the present attack, whether the patient has vomited blood or not, and when the bowels last moved; take the temperature and pulse rate; lay the patient flat with the abdomen bared and determine by gentle and careful palpation where the pain and tenderness are most marked.

ACUTE APPENDICITIS

SYMPTOMS.—Appendicitis is an inflammation of the appendix. A patient frequently complains for several days before the attack of indigestion, loss of appetite, constipation or diarrhea, and uneasiness in the abdomen, or the attack may come on suddenly. The pain may start in the pit of the stomach, then become generalized over the abdomen, and finally, after several hours, become localized in the right lower quadrant of the abdomen with marked tenderness on pressure and rigidity of muscles over that point. Vomiting generally comes on 3 or 4 hours after the beginning of the attack. The temperature may be subnormal from mild shock or be elevated to 100° or 101° F. In acute appendicitis the appendix becomes full of pus and the danger lies in its rupture with resulting peritonitis.

TREATMENT.—Place the patient under the care of a surgeon as soon as possible. In the meantime put to bed, giving nothing by mouth, not even hot water, and put a hot-water bag over the appendix. Do not use an ice bag. In case no medical officer is available for some time, liquids in small amounts may be given after 48 hours. *Never give a cathartic to a person suspected of having acute appendicitis.*

ACUTE INTESTINAL OBSTRUCTION

SYMPTOMS.—In this condition, a loop of bowel becomes constricted, resulting in the inability of the intestinal contents to move beyond the point of constriction and cutting off the blood supply to the loop of the bowel with resulting gangrene or death to the bowel. This condition is followed by absorption of poisons from the intestine, peritonitis, and death if the condition is not relieved. Two very common ways for the bowel to become constricted are by means of adhesions within the abdomen and by a loop of bowel becoming strangulated in a hernia, or rupture, as it is commonly called. The symptoms are inability to pass gas or feces by the rectum, pain in the abdomen, vomiting becoming more and more frequent, and intense shock. The abdomen may be distended above the point of constriction and be flat below that point. The bowel must be relieved of its constriction or death will ensue.

TREATMENT.—Place the patient under the care of a surgeon at the earliest possible moment. In the meantime, take the following meas-

ures: (1) If the obstruction is due to a strangulated hernia, and the case has not gone too far, put the patient in a hot tub with the buttocks elevated in order to relax the inguinal ring, and exert gentle pressure over the tumor; (2) put the patient to bed, give a soap and water enema, and nothing by mouth. *Never give a person suspected of suffering from obstruction of the bowels a purgative.*

PERFORATED GASTRIC OR DUODENAL ULCER

SYMPTOMS.—Generally, though not always, a person suffering from perforated ulcer of the stomach or duodenum gives a long history of stomach trouble. Acute pain “in the pit of the stomach,” associated with more or less shock, is suddenly felt. The pain is sudden and intensely violent, which is greatly increased by swallowing fluids, by vomiting, by turning the body, by coughing, by respiration, and by pressure. This pain may radiate throughout the abdomen, but the chief tenderness is in the region of the stomach. Vomiting occurs in about one-half the cases at the time of perforation. Shock may be severe following the perforation, but, as a rule, does not last long. A board-like rigidity of the muscles of the abdomen is present, and the temperature is usually normal or subnormal. The danger from perforated ulcer of the stomach or duodenum is peritonitis, due to the escape of stomach or duodenal contents into the peritoneal cavity.

Treatment.—Bring the patient under the care of a surgeon as soon as possible before peritonitis sets in; in the meantime, put the patient to bed, *give absolutely nothing by mouth*, and put an ice bag over the stomach; and treat shock if present.

GALLSTONE COLIC

SYMPTOMS.—Gallstone colic is due to the passage, or the attempt at passage, of a gallstone from the gallbladder to the intestines. Depending on the location of the stones, a person with gallstones may or may not be jaundiced. The patient frequently gives a history of stomach trouble with or without jaundice and may give a history of previous gallstone colic. The colic consists of spasmodic, excruciating pain over the stomach and liver, radiating upward over the right half of the thorax, frequently up under the right shoulder blade. The patient is very nauseated, and usually vomits, and often the vomiting is violent. The abdomen is distended and a condition of collapse soon comes on. The respirations are shallow, the patient groans, cries out, or flings about the bed, often assuming strange contorted positions, trying to obtain relief, frequently holding one hand over the liver region. The duration of an attack is from 4 to 20 hours, although it may last much longer. The temperature is usually normal or subnormal.

TREATMENT.—Bring the patient under the care of a medical officer as soon as possible. In the meantime, place a hot-water bag over the liver at the lower border of the ribs.

KIDNEY STONE COLIC

SYMPTOMS.—This condition is due to a small stone from the kidney entering into the ureter, which it blocks, tears, or distends. The pain is gradual or sudden in onset, is fearful in intensity and runs from the lumbar region down the corresponding thigh and testicle and into the abdomen and back. There are nausea, vomiting, collapse, and sometimes unconsciousness or convulsions. Frequent attempts at urination result in pain but little urine. The urine is often smoky or red from injury to the ureter. After a time the pain vanishes, due to the stone falling back into the pelvis of the kidney or to its passing on into the bladder.

TREATMENT.—Bring the patient under the care of a medical officer. In the meantime, put patient to bed, give plenty of water by mouth to increase the flow of urine, place a hot-water bag on the affected side of the abdomen.

DISEASES OF THE INTESTINAL TRACT

COLIC

SYMPTOMS.—This is a term applied to abdominal pain occurring in paroxysms of varying degrees of severity. The pain is usually located in the region of the navel; that is, in the middle of the belly. Colic is often preceded by constipation and accompanied by vomiting. The causes are various and the pain often may be a symptom of serious trouble. For example, abdominal pain is almost always the first and most pronounced symptom of appendicitis, intestinal obstruction, perforating ulcers of the stomach and intestines, gallstone, kidney stone, the well-known cramps of lead poisoning (painter's colic), and poisoning by infected food or other poisons. Besides being a symptom of these conditions, colic is most frequently due to overindulgence in food and drink.

TREATMENT.—Place the patient in bed and apply a hot-water bag to the abdomen, interposing a cloth between the bag and the skin or wrapping it in a towel to protect the skin from being burned or blistered. No food or drink should be allowed until the colic has subsided.

Never give a purgative or a cathartic to a person suspected of having appendicitis or intestinal obstruction and give absolutely nothing by mouth to a person suspected of having a perforated ulcer of the stomach or intestine, but bring him under the care of a medical officer at once.

An individual suffering with colic is vastly better off with nothing in the stomach and such a person can easily go without food for 2 or 3 days, but must have water, which should be given in small amounts. If the patient's bowels have not moved, an enema (injection into the rectum) consisting of a pint of warm water and soapsuds, should be given and repeated in half an hour if there has been no result.

After all pain has subsided, the patient may be given liquid or semisolid foods, such as clear soups, custards, milk, milk-toast, or soft-boiled eggs. This diet may be cautiously and gradually increased to solid foods as the pain and vomiting subside and do not return.

DIARRHEA

SYMPTOMS.—Frequent watery and straining stools accompanied by loss of appetite, nausea, and sometimes vomiting and abdominal cramps. Commonly it is an acute condition caused by some inflammation or irritation of the intestine. It is one of the main symptoms of typhoid fever, cholera, and dysentery. It is termed simple diarrhea when it occurs independently of any appreciable disease. It may be caused by exposure to cold or by eating unripe and indigestible vegetables and fruits, or decomposed or improperly cooked meat, fish, and shell fish. Drinking large quantities of cold water when the body is overheated is a frequent cause.

TREATMENT.—The patient should be encouraged to take fluids by mouth to the extent of his ability. A hot-water bag should be applied to the abdomen and the patient kept at rest in bed.

While the diarrhea is acute, the less food taken the better. During convalescence he should be given salty soups to relieve muscle cramps incident to the loss of salt in the evacuation and he should be kept on a smooth, bland diet until all symptoms have disappeared. No medicine ordinarily should be given. Small quantities of soda bicarbonate, 10 grains or 15 grains, in a little hot water may be given three or four times a day.

FOOD POISONING (PTOMAINES)

SYMPTOMS.—Sudden onset (2 to 6 hours after the food has been eaten) with violent diarrhea, vomiting, abdominal cramps, prostration, and dizziness, occurring usually in epidemic form. The severity of symptoms will vary with different individuals. In most cases the acute symptoms will be over in 12 to 24 hours, leaving for several days a marked weakness, loss of appetite, and abdominal discomfort. Recovery is usually complete in 48 hours.

Outbreaks are caused by bacterial contamination of foodstuffs that have been prepared and allowed to remain at room temperature for varying periods of time prior to being served. The most common

foodstuffs are: Meat, sausage, and meat mixtures; salads; milk and cream preparations such as cream puffs, custards, and pies.

TREATMENT.—A cathartic, such as Epsom salt, should be given immediately to rid the intestinal tract of any remaining irritant. Give water freely. The patient should be placed in bed and a hot water bottle applied to the abdomen. Food should be withheld until 24 hours after cessation of the acute symptoms. There should be a slow return to a full diet.

METHODS OF CONTROL.—Isolation.—Not required.

Quarantine.—None.

General measures.—Sources of infection can be eliminated only by freedom from disease and a high standard of personal hygiene in all food-handlers, particularly their attention to the important detail of washing their hands after visiting the toilet, by serving footstuff promptly after its preparation, and by maintaining a high standard of sanitation in the galley and butcher shop.

DYSENTERY

Dysentery, or bloody flux, as it is sometimes called, is an inflammation and ulceration of the large bowel caused by an infection.

It occurs in different degrees of severity and may be either acute or chronic. Its severest form is met with in tropical countries, where it frequently occurs in widespread epidemics and may attack a whole ship's company.

It is caused by specific microorganisms which enter the system with contaminated food or drink.

SYMPTOMS.—The disease may begin suddenly or gradually. The first stools may be like those of ordinary diarrhea, and after a day or two, or maybe a few hours, the stools contain slime and blood. Later they may become shreddy and brownish or greenish in color. The patient complains of cramps and "colicky" pains in the belly, with a burning sensation in the rectum, accompanied by a feeling as if something must be expelled, and a constant desire to go to stool. The number of bowel movements may be from 10 to 50 a day, or even 100, depending upon the severity of the case, but the quantity expelled with each movement may not exceed a teaspoonful.

TREATMENT.—The patient should rest in bed, and if possible use the bedpan, so as to insure the greatest amount of rest, which is of greatest importance. Keep the patient warm, apply hot-water bag or cloths wrung out in very hot water to abdomen, and stop all solid food. In the tropical form of the disease, ipecac, or its active principle emetine, acts as a specific, but it is required that it should be administered by skilled hands and is only mentioned here to impress

the fact that a person suffering from dysentery should come under the care of a medical officer as soon as possible.

In countries where dysentery is prevalent no fruit or uncooked vegetables should be allowed, and all foods, both cooked and uncooked, should be protected from flies, which carry the contagion. Nothing but distilled or boiled water should be used for drinking or cooking purposes.

TYPHOID FEVER

This important disease is now very rare in the naval service because of antityphoid inoculation used throughout the Navy.

SYMPTOMS.—These come on very gradually with loss of appetite, general indisposition, and headache; there may be also some cough, diarrhea, and bleeding from the nose.

It is a disease in which the fever lasts about 4 weeks. During the first week the temperature gradually rises until the beginning of the second week, when it reaches its height, and then continues until about the end of the third week, when it gradually begins to fall, ending by lysis at the end of the fourth week.

The rash appears on about the seventh day on the abdomen, back, and lower part of the chest. It consists of fairly large, raised rose-spots, which fade on pressure. They are usually few in number and come out in crops. Each spot lasts about 4 days and the rash lasts about 14 days. As the fever progresses the patient becomes very weak; he loses weight; his cheeks are slightly flushed; he is drowsy; and he is not capable of any exertion. He suffers from thirst; unless carefully attended, his lips and teeth become covered with scabs and crusts. Delirium is common.

TREATMENT.—*Along general lines.*—The patient needs careful nursing and should be removed to a hospital at the very first opportunity. When the fever is high, sponge baths should be given both night and morning, or oftener if necessary. Careful feeding is quite necessary in the treatment of typhoid fever. The chief articles of diet in typhoid fever are: milk, cream, well-cooked cereals, such as rice, grits, cream of wheat, strained oatmeal, etc.; soft boiled, soft poached, hard boiled or soft scrambled eggs; toast or crackers; fruit juices; stewed apples, peaches, or apricots, apple float, butter, soups thickened with rice or barley flour, creamed soups, mashed or baked potatoes, scraped meats or finely minced meat. Simple desserts such as boiled custard, ice cream, bread or tapioca pudding, junket, cup custard, blanc mange, eggnog, and jellies are allowed. Food should be given a little at a time and at frequent intervals—2 or 3 hours.

Drugs are of little use. The patient must be carefully watched and all his wants given attention. Diarrhea is rather common at

first. Later on, if there is constipation move bowels by enemas, not by cathartics.

METHOD OF CONTROL.—*Isolation.*—In fly-proof compartment. Release from isolation should be determined by a medical officer.

Quarantine.—None.

General measures.—Disinfection of all bowel and urinary discharges and articles soiled by them. Dishes and soiled linen should be boiled. Thorough cleaning of compartment after recovery or removal of patient. Immunize all members of crew, who are not protected. Investigate source of infection (water, milk, shellfish, and other food supplies), and carriers of the disease. Serve no raw milk or food until sure of its safety. Eliminate flies.

The germ of the disease enters the body through the mouth in infected foods or drinks, of which water and milk are the commonest, and, after that, food contaminated by flies, thus showing the importance of protecting all foods, both cooked and uncooked, from flies.

CHOLERA (ASIATIC)

An acute diarrheal disease transmitted by food, flies, water, and contact with infected persons.

SYMPTOMS.—Sudden onset with headache, prostration, diarrhea, and colic; later vomiting, purging, high fever, cold, clammy, shrunken and livid skin, rapid wasting of body, thirst, muscular cramps, watery (rice water) stools, with collapse.

TREATMENT.—Isolation, absolute quiet, application of external heat. Force fluids if possible. See a doctor immediately. (See dysentery.)

METHODS OF CONTROL.—*Isolation.*—In hospital or screened room during period of communicability, usually 7 to 14 days.

Quarantine.—Until stools are negative; contacts for 5 days from last exposure, or longer if the stools are found to contain the cholera vibrio.

General measures.—Thorough disinfection of all discharges from the bowels and vomited matter. Investigate source of infection. Use only boiled water and cooked foods and protect against flies and human handling. Immunization of contacts by vaccine, and of all personnel in presence of an epidemic.

DISEASES OF THE SKIN

THE ITCH (SCABIES)

This is an itching disease (known as the 7 years' itch, etc.) found among people living in unclean surroundings and habits. The cause of scabies is the itch mite. It is therefore a contagious disease and may be passed from one to the other by close contact. The itch mite travels from one patient to another through the medium of the

clothing, the towels, the bed clothing, personal articles, etc. The most common way of passing the disease from one to another is in having two or more persons using the same bed and same clothing.

TREATMENT.—All clothing and bedding belonging to or used by the patient which has been in contact with the skin, whether freshly laundered or soiled, such as underwear, pajamas, and socks, should be collected and sterilized by heat (steam or boiling water). Woolen clothing may be sterilized by thorough steaming with a hot iron and wet cloth as in pressing, or may be dry-cleaned. Before retiring, the patient should take a hot bath with plenty of soap. The surface of the skin, particularly in the vicinity of the eruption should be thoroughly scrubbed. Following this bath, an ointment consisting of sulfur and lard, commonly known as the official sulfur ointment (in Medicine Box) in the proportions of about 1 teaspoonful of sulfur to 1 ounce of lard, is now rubbed thoroughly into the skin from the collarbone entirely over the body to the soles of the feet, particularly in the vicinity of the eruption between the fingers, between the toes, and in the folds. There is no occasion to apply the ointments above the collarbone, as the disease seldom attacks that portion of the body. Whenever an application of sulfur ointment is applied at night, a hot bath with much soap must be taken the next morning. The sulfur-ointment bath should be repeated once a day preferably just before retiring until the eruption and itching have subsided, when it may be assumed that the patient has been cured. All clothing used by the patient during the preceding 24 hours should be collected each day and sterilized. The patient may use two sets of clothing, underwear, socks, pajamas, sheets, etc., changing each day and sterilizing that worn or used the day before. Laundering each day is desirable but not necessary. Should the eruption continue and the itching remain unabated, a second series of treatments as described should be given. Too long an application of these treatments, however, is not advisable as the sulfur tends to cause an irritation of the skin which may cover up the scabies. If the skin gets very rough and generally red from irritation, limit treatment to anointing the body with vaseline or zinc ointment.

Any locker or other place used by the patient in storing clothes, should be disinfected with the Navy standard (pyrethrum) insecticide. This may not be used in treatment, however, as actual contact is required and the insects like termites, being within the layers of the patient's skin, cannot be reached.

RINGWORM

This is a highly infectious disease of widespread prevalence, particularly in the Tropics and subtropics and during a hot, humid summer in the temperate zone. In adults it affects all parts of the

body, though rarely the scalp. On the face it is commonly called "barber's itch," in the crotch "dhobie itch," and on the feet "athlete's foot." The cause is a fungus or mould, parts of which break off and infect the clothing. When well developed, it tends to form circles (ringworm) or parts of circles. Itching is a prominent symptom. In some cases, concentric circles develop or rings form upon one another, making various patterns. The spreading border is red or reddish and more scaly than the central portion which may appear normal to the unaided eye. It may begin as a few or numerous small red patches with scaling vesicles and crusts. It may be transferred from one part of the body to another by scratching the bare skin.

TREATMENT.—The fungus is very partial to dark, damp places, such as swimming pools, wash and bath rooms, and the inner recesses of deck swabs. As the infection frequently starts on the feet, members of the crew as well as the patient should be advised not to go bare-footed but to wear some sort of a sandal, particularly in going to and from the shower, and to dry the toes thoroughly after bathing. Maceration of the skin in hot, moist weather favors spread. After bathing and while wearing shoes, the use of a good antiseptic powder on the feet and between the toes is advised. Such a powder, which may be obtained at any naval medical activity, consists of: Salicylic acid, 5 gm., menthol, 2 gm., camphor, 8 gm., boric acid, 50 gm., and starch, 35 gm. It may also be used in the treatment of the disease. The floors of shower baths, washrooms, etc., should be swabbed daily and mops should be dried in the sunshine. The patient should see a medical officer. The more intractable cases may require treatment by the ultraviolet light or by X-ray.

LICE (VERMIN)

There are three forms of lice, which vary in size and somewhat in appearance.

The condition is contagious, as these parasites can be conveyed from one person to another through the medium of comb and brush, using the same bed and sleeping clothes, the use of the same outer garments, the presence of the vermin within the quarters inhabited by all the crew, and in other ways. The eggs are attached to the hairs by a covering which is soluble in acids such as vinegar (acetic acid).

The irritated appearance of the skin is caused largely by scratch marks. The main symptom is that of itching.

The scalp.—Little lumps are seen along the shafts and at the ends of the hairs. These are the nits or eggs of the parasite. The hair should be cut short. Thoroughly anoint scalp with vaseline which should be left on for about 1 hour. Then scrub head with soap and

water and comb with a fine-tooth comb wet with vinegar. The egg cases or "nits" are soluble in acids and the vinegar tends to dissolve or destroy them. This treatment should be repeated in 3 or 4 days in order to "mop up" any remaining "nits" or adults that may have escaped the first treatment.

The genitals.—The louse which lives in the hair around the genitals is a small, round parasite commonly known as the crab louse. It deposits nits upon the hair, as does the louse of the scalp. In treating the crab louse it is first necessary to trim the hairs short around the genitals and to cut the hairs in the arm pits where there is a possibility of the infection spreading. The area is thoroughly scrubbed with soap and water and a thin coating of vaseline is thoroughly rubbed in and allowed to remain for 24 hours. These areas are then scrubbed again with more soap and water and ordinary table vinegar is applied several times during the day. This treatment must be repeated a day or two later.

The body.—The body louse is the largest of the three varieties. It inhabits the clothing of the patient and usually seeks the seams of garments. The treatment consists of changing the entire outer and under clothing after taking a bath and scrubbing the person thoroughly with a liquid soap. Infected clothing should be boiled. The patient's mattress cover and blankets should likewise be disinfected, preferably by heat.

DISEASES OF THE NERVOUS SYSTEM

HEADACHE

Headache is a symptom of disease of some part of the body. It generally accompanies the acute fevers, is associated with constipation, disorders of the stomach, liver, kidneys, and genital organs. Eye strain is a frequent cause.

TREATMENT.—Remove the cause if possible. Open the bowels with a dose of castor oil or Epsom salt and give 10 grains of aspirin or 5 grains of phenacetin, and repeat in 3 hours if necessary. A little hot tea and toast should be given with this medicine to prevent nausea. A medical officer should be consulted if this does not benefit the patient.

CEREBROSPINAL FEVER

SYMPTOMS.—Incubation period—2 to 10 days, commonly 7. Onset is sudden with symptoms of an acute cold, fever, headache which may be almost unbearable, nausea, rigidity of neck and insomnia followed by delirium or coma. In some cases marked drowsiness and headache and presence of an acute cold are the only symptoms. Frequently appears during epidemic of acute colds. A rash of dusky red spots,

not vanishing upon pressure first appears upon the chest, abdomen, and back. It may be slight in mild cases but prominent in severe cases.

TREATMENT.—Absolute quiet in a cool, dark room. As administration of serum is required to prevent serious disability or death, the patient must be placed under the care of a doctor at the earliest possible moment.

METHODS OF CONTROL.—*Isolation.*—Isolation of infected persons until 14 days after onset of the disease. Isolate immediate contacts.

Quarantine.—None.

General measures.—Disinfection of articles soiled by discharges from the nose and throat. Prevent overcrowding, chilling, fatigue, and undue strain. Thorough cleansing of compartment after recovery or removal of patient.

DELIRIUM TREMENS

Delirium tremens occurs as an incident in the life of persons addicted to the excessive use of intoxicating liquors.

SYMPTOMS.—Loss of appetite, sleeplessness, or a marked mental depression are the chief symptoms of the first stage of the affliction known among drunkards as “the horrors.” As the disease advances the patient talks incoherently, has a wild expression, his mind wanders from one thing to another. He answers questions in a rambling manner and fancies he is being pursued by wild animals, or that he sees rats, snakes, and other animals crawling on the walls around his bed. The delirium is always worse at night, but the patient requires watching at all times, for he may try to jump overboard or commit suicide in some other way. Delirium tremens may be confused with the delirium of acute fevers. Pneumonia is a frequent complication of delirium tremens and in fatal cases may be the direct cause of death. It may, in drunkards, follow a fracture or other injury.

TREATMENT.—The patient requires constant attendance. In all cases the symptoms are aggravated by the lack of food, which the patient has been either unable or unwilling to take. Careful feeding is of the utmost importance. Thick, nourishing soup constitutes the best food in this condition and should be given every 2 hours and the patient encouraged in every way to take food. Arrangements should be made for a medical officer to assume charge of the case as soon as possible. Give hot beef extract. This, and the soups are rendered more effective and palatable by addition of pepper as seasoning. The serious symptoms are largely due to sleeplessness, and if several hours of sound sleep can be produced, improvement is almost sure to follow. To this end, phenobarbital in 1½-grain doses should be given with water every 3 hours for 4 doses. Sometimes by wrapping the patient in a sheet and blankets wrung out in very hot water and at the same time

applying cold to the head, a sedative or quieting effect is produced and the patient gets rest, even if no sleep.

DISEASES OF THE EYE

INFLAMMATION

In all inflammations of the eye, ascertain at once if the individual has gonorrhea. If he has, the chances are that you are dealing with a very severe condition which should be brought to the attention of a medical officer immediately. Treatment of this condition (gonorrheal ophthalmia) is discussed in the next chapter. Simple inflammation is caused by irritation, such as exposure to the wind or dust, by foreign bodies in the eye, and frequently by the fumes of turpentine contained in paint used in confined places as when painting double bottoms, etc.

SYMPTOMS.—The eye is bloodshot and watery, the patient complains of pain; the sensation of sand in the eye, and heat. A thin watery discharge appears which tends to stick the lids together.

TREATMENT.—Turn back the upper lid, pull down lower lid, remove all small particles of dust and dirt by gently wiping the lid with cotton loosely wound about a match stem. To turn back the upper lid, have the patient look downward then lay a match stem lengthwise along the middle of the lid, press down gently and at the same time pull up on the lashes. Have the patient look in all directions, for by this means particles of irritating matter which do not at first appear may be brought to view. After having removed all the irritating particles, wash the eye with warm borax solution using a small piece of cotton saturated with this solution held very closely to the inner angle of the eye. Do not drop solution on the eyeball.

Eye wash (or borax lotion).—A simple, soothing and antiseptic eye wash may be made as follows: To 2 quarts of boiled, distilled water in a large bottle, add 1 level teaspoonful each of borax, sodium chloride (table salt), and sodium bicarbonate (baking soda). Dissolve by shaking, and let stand until clear. Pour off the clear fluid and bottle. Use in the eye bath freely, either cold or warm. This solution is alkaline, nonirritating, and is much superior to boric acid solution.

STYE

A stye is a pustule which forms on the margin of the eyelid around an eyelash. The lid is inflamed, painful, and has the general appearance of a small boil.

TREATMENT.—Pain may be relieved by applying squares of gauze wrung out of hot salt solution. When the stye ruptures, keep the lid clean with frequent washings with salt solution or borax solution in order to prevent recurrence of styes. Yellow oxide of mercury ointment painted on the margins of both lids of both eyes upon retiring

will assist in the cure and act as a preventative. Recurring styes may be a symptom of defective vision. In such cases, the patient's eyes should be refracted by a medical officer when the schedule of the ship will permit.

DISEASES OF THE EAR

EARACHE

Earache is due to so many different causes that a medical officer should be consulted as soon as possible. To relieve pain, if very severe, give aspirin (5 grains) two or three times at intervals of 4 hours, and one Dover's powder (5 grains) at night if pain persists.

DISEASES OF THE TEETH

TOOTHACHE

This condition is usually due to an inflamed pulp which has become infected or irritated through a cavity in the tooth, the congestion compressing the pulp against unyielding sides of pulp cavity causing pain. To give relief, remove particles of food from cavity and insert a small piece of cotton moistened with dentalone or eugenol after first touched to another piece of cotton to remove excess fluid. Excess fluid may burn the gums. This treatment should be renewed every day or two until dental attention is available. Should swelling of soft tissue occur, apply heat and administer sedatives.

OTHER CONDITIONS

SUNSTROKE—HEATSTROKE

Sunstroke is an attack of illness caused by exposure to the rays of the sun; but the same condition may be produced in hot weather by exposure to high temperatures not in the direct rays of the sun, particularly if the person is engaged at hard work in close quarters. Men working in the fire and engine rooms are sometimes affected by the heat in those spaces. Men debilitated from or addicted to the excessive use of stimulants are more apt to suffer than those of temperate habits.

Sunstroke occurs in two forms—heat stroke (heat fever), in which the temperature of the body is very high, and heat prostration or heat exhaustion, in which the surface of the body is cool. The difference is very important because of the different treatment required.

In severe cases of heatstroke the person may be stricken down and die in a few hours. In other cases there may be intense headache, dizziness, marked restlessness, nausea and vomiting, and hot, burning skin. The clinical thermometer may register 105° F. Pulse is strong and may be slow or fast, and breathing is difficult. The patient soon becomes

unconscious, and if left untreated the unconsciousness deepens and death may follow within 24 hours.

In heat prostration the surface of the body is cool, the pulse weak and rapid, and the patient feels exhausted. There may be only slight nausea and vomiting, and under treatment the patient may rapidly recover; or, on the other hand, there may be complete loss of consciousness and a rapid and fatal termination from exhaustion. This prostration is often accompanied by muscular cramps, particularly in persons who have been doing hard work while exposed to high temperatures. These cramps are extremely painful, and the attacks may last from 12 to 24 hours. The muscles may remain sore and the patient weak and listless for several days after the seizure, although the attacks vary from a slight cramp in the abdomen or limbs to general cramps in all the muscles. Muscle cramps are due to loss of salt through excessive perspiration.

TREATMENT.—In heat stroke (heat fever) the temperature of the body should be reduced as rapidly as possible. Place the patient in a tub of cool water, add ice, and rub the body briskly with the hands; keep an ice bag to the head, and continue the treatment until the temperature is reduced to 100° F., as shown by the thermometer inserted in the rectum.

In heat prostration, with cool skin, stimulate the patient and rub his body and limbs. Hot rich soup or tomato juice, each well salted, given with the patient at rest in bed has proven very useful in this condition. It is necessary that the soup should be hot; and even when there has been vomiting, administering hot soup both stimulates the patient and stops the vomiting. This should be repeated as soon as the patient feels at all hungry, and in the meantime hot tea should be given. In the more severe cases, hot food and drink will not suffice and then the patient should be given stimulants (aromatic spirits of ammonia), kept warm by blankets and hot-water bags, and a mustard plaster placed on the abdomen; and if the cramps are severe, the muscles should be vigorously rubbed. Salt should be given in all fluids, including water, but not in amounts sufficient to cause nausea or vomiting.

Heat prostration may be prevented, in a large measure, by supplying men exposed to high heat with salinized water.

Chapter IV

VENEREAL DISEASE

GONORRHEA

On all small craft any person developing an acute active case of gonorrhea should not be retained as a member of the crew, but should be transferred to a naval hospital as soon as possible. Until that time the following treatment should be used.

Gonorrhea is an inflammation of the urethra due to micro-organisms called gonococci. It usually occurs in from 3 days to 2 weeks after exposure, oftenest during the first week. First there is noticed an itching sensation, with a slight puffiness and redness about the lips of the opening. This is soon followed by a creamy discharge. There may be marked burning and difficulty in urinating.

Some facts regarding this disease are as follows: (1) Gonorrhea is a disease in which the germs reach depths in the tissues far out of reach of drugs applied locally. (2) Cure is brought about by the patient's own tissue response which can be aided by the direct application of mild chemical solutions. (3) Cure will be greatly delayed or even rendered impossible by the use of alcoholic beverages, inhalation of fumes of alcohol, any sexual excitement, prolonged physical exertion, and use of too strong, too frequent, or irritating treatment. (4) Cooperation of the patient is imperative. The greater it is, the gentler the treatment, the milder and shorter is the disease and the fewer its complications.

The disease usually subsides in from 1 to 3 months. It is often difficult to tell absolutely when it is cured. The gonococci may invade the blood stream and attack numerous organs of the body.

Treatment.—If any of the complications are present, rest in bed is absolutely necessary. The patient should drink plenty of water, avoid stimulants (alcohol, tea, coffee), and be regular in eating and sleeping. He should avoid eating greasy food and should keep his bowels well open and bathe frequently in hot water, if practicable.

A 5 to 10 percent colloidal silver solution (argyrol) is an excellent injection. This solution deteriorates slowly, consequently a fresh solution should be prepared for each case. Before injection, urinate, then run the solution into the canal from a penis syringe and hold solution in canal from 5 to 10 minutes before allowing to escape. Not more

than 7.5cc (2 teaspoonfuls) should be used at a time and one or two injections in 24 hours are usually of greater benefit than a larger number. If it causes an increased flow of pus lasting more than an hour or two, or undue pain, the solution is too strong and should be diluted.

The penis should be kept clean, thoroughly bathed in hot water or hot salt solution (1 teaspoonful of common salt to a pint of water). Do not put cotton over the head of penis or use cotton in a tobacco bag, but use a piece of gauze cut about 4 inches square, with a slit in the center through which the head of the penis is passed until the gauze rests in the groove behind the head. The foreskin then is drawn down over the gauze which protrudes from the orifice of the foreskin and catches the pus as it is discharged from the urethra. This dressing should be changed several times daily, according to the amount of the discharge. If the foreskin is too short to hold such dressing in place, the end of the penis can be covered by a tobacco bag into which some gauze is placed. If urination causes pain or burning, immerse penis in a basin of hot water and allow urine to flow. Increase the intake of water and add to each tumbler a pinch of soda. To allay local pain and inflammation, the penis should be immersed several times a day in hot water. The testicles must be supported by a well-fitting suspensory bandage which does not press upward on the urethra at the junction of the penis with the scrotum and thus interfere with the free drainage of the urethra. This may prevent a swollen and painful testicle.

COMPLICATIONS OF GONORRHEA

CHORDEE (PAINFUL ERECTION).—This condition occurs especially at night. If it occurs, apply cold applications. Avoid too warm bed clothing. Keep bowels open. Keep mind clear of sexual thoughts. Empty bladder before turning in. Sleep on side.

PHIMOSIS.—The foreskin is elongated and contracted down over the head of penis.

Treatment.—Soak in hot water or salt solution, if there is no relief try cold water.

PARAPHIMOSIS.—A condition where the foreskin is swollen, rolled back, and tight.

Treatment.—About the same as for phimosis. Patient should be put to bed in treating the above complications. Get a doctor.

BUBO ("BLUEBALLS").—Swollen glands in the groin.

Treatment.—The most important thing is rest in bed. Cold applications are effectual at the outset, but later hot ones are better. If suppuration occurs (pus forms), an incision may be necessary. This

should not be done by a layman. In time the abscess will break of itself. Wash out with sterile, warm, plain water or salt solution, apply wicks of gauze in the opening for drainage, and dress. Should be redressed as often as dressing becomes soiled. Burn all soiled dressings and wash your hands after dressing a bubo.

ORCHITIS (SWOLLEN TESTICLE).—A frequent complication of gonorrhea.

Treatment.—Rest in bed most important. Support and elevate the testicle. Apply cold or hot applications; hot is probably more agreeable. Keep bowels open.

STRICTURE OF URETHRA.—Usually a late complication of gonorrhea which probably will not have to be treated on a ship without a member of the Medical Department on board. Sometimes, however, it does not occur in the early stages of gonorrhea and the patient is in great pain and unable to pass his urine. Induce him to void his urine by applying hot applications over the bladder or placing him in a hot bath. If the condition is urgent, and a doctor cannot be gotten, as the last resort attempt to pass a catheter, if one is at hand. It should be sterile (boiled) and well greased with oil, albolene, glycerin, etc. It should be manipulated gently and with as little force as possible.

GONORRHEAL INFLAMMATION OF THE EYE.—This condition is usually found in patients who have the clap and is caused by the individual rubbing or touching his eye after handling the penis and not having washed his hands. The inflammation spreads very rapidly and is very severe. The lids are swollen as are the inner parts of the eye and thick pus soon begins to discharge.

Treatment.—The sound eye should at once be protected by a shield consisting of a watch-glass crystal fixed over the eye with adhesive plaster. The infected eye should then be washed frequently with boric-acid solution, and a little vaseline applied to the edges of the lids so they will not stick together and retain the pus. Cold applications should then be applied to the infected eye, and this may be done by placing small pieces of cloth on a cake of ice and transferring them to the eye, making the changes frequently. A doctor should be consulted at once. In all cases of inflammation in the eye the patient should be kept in a dark place, or the eye protected from the light by a shield.

SYPHILIS

Syphilis is a communicable infection that frequently causes dangerous constitutional disease and is usually acquired during sexual contact. It may rarely, however, be contracted otherwise. The primary lesion of syphilis is a sore called a chancre, and starts at the point of inoculation, particularly where there has been a slight injury to the

skin or mucous membrane. If due to sexual contact, it is found upon the penis. It may start upon the lips, tongue, or tonsils. It usually appears from 3 to 6 weeks after exposure. However, the sore may not develop for 90 days after exposure. The average is about 1 month. It may appear as early as 10 days. It usually starts as a papule or pimple, which breaks in the center and forms an ulcer with hardened edges. This is soon followed by enlargement of the glands in groins and neck. In about 1 or 2 months the skin eruption appears. There may be sores on the lips, tongue, or cheeks, and a general sore throat. The hair may fall out and the patient may complain of headache, general muscular and bone pains and fever.

Treatment.—Syphilis can be cured if treatment is begun promptly and taken under proper medical supervision. Consequently, a man with a sore on the penis or a sore elsewhere that does not heal promptly should see a doctor at once. The sore should be protected with a loose gauze dressing which should be changed twice daily. This gauze dressing should be kept moist with a warm salt solution (1 teaspoonful of common salt to a pint of water). Antiseptics should never be used on a sore on the penis or on any sore that may be venereal in origin. Use of antiseptics may delay the making of an accurate diagnosis for weeks or even months and thereby prevent the patient from receiving early treatment which is so important for his cure.

CHANCROID

A soft chancre, venereal ulcer upon the penis. Usually occurs from 2 to 10 days after exposure. Is sometimes hard to differentiate from hard chancre—primary stage of syphilis. Sore may be mixed—both chancre and chancroid. Keep sores clean with soap and warm water, then wash with warm salt solution (1 teaspoonful of common salt to a pint of water). This should be done several times daily. The same general rules about attention to the cleaning of hands after handling penis apply here as in gonorrhea. Also attention to towels, etc., of patient, to prevent its spread to others. The man should be seen by a medical officer as soon as a sore develops.

LYMPHOGRANULOMA

This so-called fourth venereal disease resembles chancroid and bubo in many respects and is accompanied in many cases with fever, loss of appetite and weight and prostration. It is transmitted by direct contact (sexual intercourse) and the discharges from the sores and buboes are infectious. Treatment is the same as for chancroid and the patient should be placed under the care of a medical officer.

PROPHYLAXIS

Because of their prevalence, ready transmissibility, and far-reaching effects, the venereal diseases are a menace to home and to family life. In one way, and one only, can infection with venereal disease be prevented and that is by completely avoiding promiscuous sexual intercourse. Clean living, the indulgence in athletic sports which promote health and occupy the mind, and the avoidance of alcohol during hours of relaxation are important factors in the prevention of venereal disease.

The use of both chemical and mechanical prophylactics against venereal infection has been advocated in the Navy for many years. The effectiveness is high when these measures have been used early and properly. Those who expose themselves to the danger of contracting a venereal disease should be urged to use immediate prophylaxis. The oldest and best prophylactic measure is the mechanical appliance known as the sheath or condom which is usually made of rubber. In the use of a condom it is essential that some space remain at the end to prevent any chance of undue stress or strain on the rubber. Upon removal care must be exercised so as not to increase the chance of contamination from the sheath. Then immediate washing of the penis and surrounding parts and the proper application of the contents of a prophylactic tube or 33-percent calomel ointment will prevent many a case of venereal infection. Prophylactic tubes, often called sanitubes, are supplied in the medicine box.

Medicinal or chemical prophylactic treatment used immediately or within the first hour after exposure is very efficacious in preventing the development of venereal infection. Although its value rapidly diminishes from then on and is greatly reduced after 8 hours have elapsed, men returning to the ship or station within 8 hours following exposure should be urged to avail themselves of chemical prophylaxis.

A careful record should be kept showing the name and rating of the person treated, the hour of treatment, the hour and place of exposure, and the name and address of consort.

The Navy prophylactic tube consists of a pliable, metal tube with a tip which can be inserted into the urethra. One-half of the contents is injected into the urethra and the other half is used externally. Use of the contents immediately before cohabitation is a valuable preventive measure.

The method of prophylaxis used in most Navy prophylaxis stations is to have the man urinate and then thoroughly wash the penis, scrotum, and pubic region with liquid soap and warm water. One-

half a syringeful of 1-percent solution of strong protein silver (protargol) or 10-percent solution of mild protein silver (argyrol, silvol) is injected gently into the anterior urethra and allowed to flow out; the remainder is then injected and held in the urethra for 5 minutes. When parts that were washed have thoroughly dried, the penis, scrotum, thighs, and pubic region are liberally anointed with 33 percent calomel ointment in lanolin. The ointment should be well rubbed in for at least 10 minutes, paying special attention to the fold between the head and foreskin. The clothing should be protected with a temporary dressing and the ointment allowed to remain for 12 hours.

It should always be remembered that diseases that have attacked more than half the men of the country during youth, diseases that bring misery to thousands of children and suffering to hundreds of thousands of women innocently infected, and that are incurred almost exclusively through promiscuous sexual intercourse, are diseases to be avoided. It should also be remembered that the man who practices promiscuous cohabitation almost invariably contracts one of the venereal diseases, sooner or later, in spite of every precaution. And, if sufficient moral stamina to resist sexual temptation is not possessed, then it must be remembered to take prophylactic treatment as soon as possible after exposure.

Chapter V

HOSPITALIZATION

Sick, wounded, or disabled officers and enlisted men of the Navy, or Marine Corps are entitled to the benefits of medical and dental attendance by naval medical and dental officers either within or without a naval hospital, and to hospitalization within naval hospitals so long as they remain sick, wounded, or disabled (N. R. 1187, 1191).

In the absence of naval hospital facilities, the hospitals of the United States Army, the Public Health Service (including hospitals under contract), or the Veterans' Administration shall be utilized for hospitalization of the personnel of the Navy and Marine Corps subject to the following conditions:

1. Where naval hospitals are not available.
2. Hospitalization must be authorized by the commanding officer, or the senior officer present.
3. The consent of the officer-in-charge of the hospital must be obtained.

Patients may be hospitalized in civil hospitals subject to the following conditions:

1. Facilities of naval or other Government hospitals are not available.
2. Patient must be in a duty status.
3. Immediate hospitalization is required for the proper care and treatment of the patient.
4. Hospitalization must be authorized by the commanding officer, or by the senior officer present; and, when not an emergency, by the Bureau of Medicine and Surgery.

Attention is also invited to instructions in articles 1143 and 1203, N. R., concerning patients transferred to other than a naval hospital, particularly in a foreign port.

The public health officer of the port, if present, should be consulted regarding hospital facilities, and admission of the patient should be made with his approval and under his directions. A list of the Public Health Service hospitals as well as its contract stations will be found in the annual circular, Contracts for the Care of Seamen, etc., issued by the Public Health Service.

Bills for treatment in Government hospitals other than naval are submitted to the Bureau of Medicine and Surgery for payment through the respective heads of the activities concerned or direct to the Bureau, in the case of civil hospitals, and no payment by the commanding officer of the ship is therefore required.

Claims for dental expenses will be allowed only when such expenses have been incurred in emergencies by personnel of the Navy and Marine Corps to whom the services of a naval dental officer were not available, and when the approval of a naval medical officer, if available, has been secured.

The term "in emergencies" is intended to be applied to treatment rendered to alleviate suffering or to prevent suffering which will obviously occur before the approval of the Bureau of Medicine and Surgery can be obtained. Emergency treatment will not include the furnishing of prosthetic appliances or the use of precious metals.

Attention is invited to article 1189, Navy Regulations, in which are stated the conditions under which medical expenses may be allowed, and especially to the requirement that payment of such expenses is contingent upon the prompt reporting of illness or injury to the Bureau of Medicine and Surgery.

Upon completion of treatment, unless authorized in advance by an approved requisition, itemized certified bills shall be submitted to the Bureau of Medicine and Surgery in duplicate, and shall show the cost of each item of expense and the dates on or between which the services were rendered; for dental treatment they shall also show in detail which teeth were treated, the nature of the treatment rendered and the materials used. Bills of other Government hospitals will be submitted through their respective headquarters.

Receipt of the services by the party receiving treatment or by the officer authorizing same shall be acknowledged either on the face of the bills or by separate certificate.

When requisitions for civilian medical, dental, nursing, or hospital treatment of service personnel are approved by the senior officer present in advance of the Bureau's approval, Form U report shall be accompanied by a copy of the requisition and a copy of each public voucher covering payment.

Ordinarily, naval personnel on leave are not in a duty status and are not, therefore, entitled to medical or hospital treatment at Government expense. When leave is canceled or extended, the status remains the same and commanding officers are without authority to authorize treatment for them at Government expense. Personnel who have been granted liberty for a period of 24 hours or less are considered as in a duty status provided that during the period of liberty it would be

fairly practicable to secure their return for the performance of duty should their presence be required.

Commanding officers are responsible for bringing this information to the attention of all officers and enlisted men about to go on leave of absence and to the personnel under their charge when on detached duty. Personnel on leave of absence may be hospitalized in Government hospitals other than naval on authority of the Bureau of Medicine and Surgery.

A report on NMS—Form U shall be immediately forwarded in duplicate to the Bureau in each case of any sickness or injury of personnel of the Navy or Marine Corps where treatment is received from other than the Medical Department of the Navy. This report is required in all cases where medical, dental, or hospital treatment is furnished by civilian physicians, civilian dentists, civil hospitals, or Government hospitals other than naval to personnel of the Navy and Marine Corps, active or inactive, on duty or on liberty or leave, under circumstances that eventually may be used as the basis of a claim against the Navy Department. This report should be prepared by a naval medical officer when practicable, and in the absence of such officer, by the senior officer present, or by the individual concerned as soon as able.

If printed forms are not available, a typewritten report may be made in duplicate giving the following information: Name and rank or rating; date and place of birth; station or vessel to which attached; diagnosis; prognosis; status (duty or not). If on liberty, state exact period for which granted and the hours and dates from and to; circumstances; disposition; give dates on or between which services were rendered; by whom were the services rendered. Were the services necessary and authorized, and by whose authority? Where authority is given in writing, a certified copy of same should be attached to this form. Where authority is given verbally, a certificate of the officer granting same should be attached and should show when and how the services were authorized. Were the services of a naval medical (or dental) officer or a naval hospital available? In the case of an officer, the date of his orders and the name of the Supply Corps officer carrying his accounts shall be stated. When an officer is admitted to a hospital for treatment, statement shall also be made as to whether or not hospital ration notice (S. & A. Form No. 35-M) has been issued.

Due to the uncertainty of the movements of naval vessels, the personal effects of an officer or man of the service are sent with him whenever he is transferred to a hospital for treatment (N. R. 1143, 1187).

Chapter VI

DEATHS

The commanding officer shall cause to be entered in the log book the name and rank or rating of any person who may die on board, with a statement as to the exact time and cause of death (N. R. 908 (1)).

When death occurs while the ship is at a port within the continental United States, the commanding officer shall report the same to the Secretary of the Navy by dispatch, giving the following information: (a) full name; (b) rank or rating and service number; (c) branch of service; (d) in the case of a reservist, whether or not on active duty; (e) date, place, and cause of death; (f) line of duty and misconduct status; (g) full name and relationship of next of kin; (h) address of next of kin; (i) whether or not next of kin has been notified; (j) what disposition has been or will be made of remains, or where the remains are being held; (k) pay per month; (l) full name and address of beneficiary; (m) whether or not the deceased carried United States Government life insurance and date to which premiums have been paid. In case full information under any of the foregoing headings must await later investigation or determination, the dispatch shall be sent with whatever data are available, and supplemented with complete information at the earliest possible date. In such cases he shall also inform (by dispatch) the nearest relative or legal representative of the deceased (unless living outside of continental United States) and request him to communicate by telegram with the Bureau of Medicine and Surgery, Navy Department, or the Commandant, Marine Corps, Washington, D. C., regarding disposition of the remains. If practicable, the body shall be transferred immediately to the nearest naval hospital or to the medical department of the nearest navy yard or station for embalming, preparation, and retention for such further disposition as may be directed by the Bureau of Medicine and Surgery. Otherwise the body shall be embalmed and retained on board until directions for disposition are received (N. R. 908 (2)).

When death occurs at sea or in a port outside the continental United States, the commanding officer shall not notify the next of kin by dispatch but shall make report by dispatch to the Secretary of the Navy, giving the information specified in the preceding para-

graph, and request instructions for disposing of the body. Whenever practicable, the remains shall be embalmed and retained on board awaiting instructions from the Bureau of Medicine and Surgery, and burial shall not be made in a foreign port or at sea in advance of receipt of such instructions, except when preservation or retention of the body is impossible (N. R. 908 (3)).

Whenever loss of life occurs from accident or under peculiar or doubtful circumstances, a court of inquiry or a board of investigation should be ordered to investigate fully and report on the circumstances and facts, and also to give an opinion and to make such recommendation as may be appropriate. The court of inquiry or board of investigation is held in accordance with the provisions of chapter X, Naval Courts and Boards.

In all cases of death occurring in the Navy under unnatural or suspicious circumstances, or where the cause of death is obscure or not apparent and a decision as to origin affecting pension or gratuity is involved, the commanding officer should have such post mortem examination or autopsy as may be required in determining the exact cause of death performed by a medical officer, or, if none is available, by a competent civilian physician. In all cases the autopsy must be performed in a manner requiring no more disfigurement of the body than is necessary to obtain the evidence necessary. The results of all autopsies shall be fully recorded in the reports of death and health records.

When burial is necessarily made in a foreign country, the health regulations as to disinterment shall be ascertained and reported by letter to the Bureau of Medicine and Surgery, together with information as to date, place, and other circumstances of burial.

Payment of expenses in connection with burial in a foreign country may be arranged through the nearest United States consul in the same manner as payment of bills for hospital treatment, reimbursement to be made by the Navy Department to the State Department upon presentation of receipted vouchers. Such expenses, so far as practicable, should be limited to the lowest amount consistent with decent preparation and encasement in accordance with Navy Regulations, or to meet the requirements of laws governing transportation.

Whenever the services of a civilian undertaker are required within the United States or any of its possessions, the same limitations will be observed and itemized bills properly certified will be forwarded to the Bureau of Medicine and Surgery for settlement.

Cremation of remains will be permitted at Government expense only when authorized in advance by the Bureau of Medicine and Surgery.

The necessary and proper funeral expenses of officers and enlisted men of the Navy and Marine Corps at naval stations within the

United States will be provided for by annual contracts, and elsewhere within the United States will be allowed when approved by the Bureau of Medicine and Surgery, or by such officers as may be designated by the Commandant, Marine Corps, respectively.

The amounts paid for funeral expenses, including preparation, encasement, and interment of remains, shall not exceed \$200 each, unless due regard for decent burial renders greater expense necessary, which fact must be certified on all copies of the public voucher by the officer ordering the payment of the bill.

The remains of naval dead shall be prepared for interment or for shipment to their homes under the supervision of an officer who shall determine by final inspection in each instance that the work of embalming, cleansing, shaving, and dressing have been competently performed, and that the encasement, clothing, etc., meet all the requirements of the occasion and comply with the terms of the contract.

Each body shall be dressed in a clean, presentable, and complete uniform (except for cap and shoes) of the proper rank or rating. A cap may be placed inside of the casket. When a body is sent to a hospital or hospital ship for embalming and further disposition, suitable uniform for burial shall be sent with it. Where available clothing belonging to a deceased officer or enlisted man is not sufficient in quantity or of proper kind or quality, or is too much worn, new clothing (outer and under) shall be obtained as may be necessary from the Supply Department and charged to the appropriation "Care of the dead."

Especial care shall be exercised that the evidences of autopsies shall not cause unnecessary distress to parents, and that the wounds so made shall be neatly closed, and that packings and dressings employed shall be of clean and suitable material.

Navy (or Army) standard caskets, when available, shall be used for transportation of remains of officers and enlisted men.

When transportation of remains of naval or Marine Corps personnel is to be effected, the shipment if by rail will be either on tickets procured by transportation request or by express on Government bill of lading; and, if by commercial steamship, on minimum first-class fare. One copy (fifth) of the bill of lading, on which transportation of remains of the dead is effected, shall be securely pasted on top of the shipping casket with a dextrin paste, similar to that used by the express company, and then covered with shellac or varnish. A special label, prohibiting collection of express charges from consignee, should be obtained from the local express agent and attached to the outside case, in addition to the copy of the bill of lading. If Government bills of lading are not available, the civilian undertaker should include transportation charges in his bill, sub-

mitting receipts from the transportation company. Under no circumstances should a body be sent "collect."

Personal effects of active-duty personnel not to exceed 150 pounds may be forwarded with the body when shipped either by express or on transportation request without additional charge. When personal effects exceed 150 pounds, any excess should be delivered to the supply officer for shipment, such excess being chargeable to the appropriation "Instruments and supplies, Bureau of Navigation," for Navy personnel and "General expenses, Marine Corps," for Marine Corps personnel.

The next of kin, family, legal representative of the deceased, or the consignee, should the body be sent to other than the preceding, shall be informed by telegram of the time and method of forwarding and, if practicable, the routing and scheduled time of arrival at destination; also of any special attending circumstances, such as communicable disease and the advisability or inadvisability of opening the casket for the purpose of viewing the remains. Copies (original and sixth) of the bill of lading will be promptly forwarded to the consignee, under special-delivery stamp, and accompanied by an explanatory memorandum. Investigation has determined that in most instances where the express company attempts to collect express charges from consignee, the difficulty has been due to failure of the bill of lading to arrive in advance of the body, or to a misunderstanding on the part of consignee as to its purpose.

The senior officer present is authorized to issue a national flag (United States national ensign No. 7) to accompany all bodies of naval or Marine Corps personnel forwarded or delivered to the next of kin or relatives for private interment, in order that the flag may be available for use at the time of burial. Request for such issue shall be construed as included in application for the body. The flag shall be inclosed in a suitable canvas bag or sack and securely attached to the casket, or placed inside the shipping box, in which case the box shall be labeled "FLAG INSIDE" or the consignee otherwise notified. The act of May 26, 1928, authorizing the Secretary of the Navy to furnish an escort to place of burial for the naval dead who have lost their lives in the naval service, permits the selection of a relative or other person not a member of the Navy or Marine Corps to be sent as such escort at Government expense. The expenses so authorized include subsistence en route and sleeping-car accommodations to place of burial and return therefrom when necessary. Upon request of the next of kin or family of the deceased, a service or civilian escort of one person may be assigned to accompany the remains to place of burial. The escort, if of the service, shall be of the equivalent rank or rate of the deceased so nearly as may be prac-

licable and, when possible, a friend or associate. United States Navy Travel Instructions contain full instructions relative to travel allowances and outline the details to be followed in sending an escort to accompany to place of burial the remains of officers and enlisted men who have lost their lives in the naval service. The travel of the escort may be from point of shipment to place of burial and return, or from the place of prospective burial to the point of shipment and return, the amount of travel involved in either case being the same. When the remains are returned to the United States from points outside the continental limits, a relative may travel as escort to point of reshipment within the United States. One first-class passage at minimum rate will be furnished such civilian escort. From this point the commandant of the yard or station shall arrange for escort to final destination of remains as in other cases.

All transportation and travel expenses of the escort to the prospective place of burial and return therefrom will be a charge to "Pay, subsistence, and transportation or general expenses, Marine Corps," as the case may be. The only charge to be lodged against the appropriation "Care of the dead," when remains of naval dead are shipped on transportation requests, is for the cost of the corpse ticket. In the case of Marine Corps dead, the cost of both escort and corpse ticket is a charge to "General expenses, Marine Corps."

The commanding officer shall, upon the death of any person on board the ship under his command, cause all of the effects of the deceased to be collected and inventoried. If the deceased was an officer, this shall be done by two officers of the ship; if a member of the crew or other person, by the officer of his division or one detailed for the purpose. The inventories shall be made out in duplicate, duly attested and signed by the officers making them. Upon the completion of the inventory the effects, if not of a perishable nature, shall be put up in packages of a convenient size and sealed with the seal of the ship. The commanding officer shall retain one copy of the inventory himself, and shall deliver the other to the supply officer, who shall also take charge of the effects for safekeeping (N. R. 908 (4)).

If any of the effects of a deceased person are perishable and deteriorating, they shall be immediately sold at auction, and the proceeds of sale shall be disposed of in the same manner as other money found in his effects (N. R. 908 (5)).

All moneys, articles of value, papers, keepsakes, and other similar effects shall be forwarded to the legal representative, or in default of such, the heirs at law of the deceased. Should it be impossible to ascertain the existence of the legal representative or of heirs at law, the articles mentioned and other similar effects shall be sent to

the Chief of the Bureau of Navigation or to the Commandant of the Marine Corps, as the case may be, for safekeeping. Should the above-described property be unclaimed for a period of 2 years after the death of the owner thereof, all articles and effects so deposited shall be sold at auction to the highest bidder, and the proceeds of such sale shall be deposited in the Treasury as miscellaneous receipts (N. R. 908 (6)).

If at any time during the 2 years such above-described property is in the custody of naval authorities the legal representative of the deceased person shall apply for his effects, all shall be delivered to him (N. R. 908 (7)).

The commanding officer shall exercise his discretion in causing the effects of deceased enlisted men to be sold at auction at the mast, or retaining them for transmission to the heirs, relatives, or friends. In exercising this discretion, he shall be governed by the wishes of the heirs, relatives, or friends, if possible to learn them. If sold at auction, the proceeds of sale shall be disposed of in the same manner as moneys found in their effects (N. R. 908 (8)).

He shall cause the accounts of all deceased persons to be closed as soon as possible and forwarded to the General Accounting Office, together with the will, if any can be found. These accounts must be examined and approved by the commanding officer (N. R. 908 (9)).

He shall advise the heirs or next of kin of a deceased officer, nurse, or enlisted man to communicate with the Bureau of Supplies and Accounts relative to the submission of claim for arrears and pay due. Payment of death gratuity will be made by the Bureau of Supplies and Accounts (N. R. 908 (10)). For additional information pertaining to deaths and resultant duties, the reader is referred to articles 908 and 1841, United States Navy Regulations, and chapter 19, Manual of the Medical Department, 1939.

Chapter VII

PERSONAL HYGIENE

By personal hygiene is meant any measure taken by the individual by which he can avoid disease and promote his health and strength. Such measures include the eating of the proper amount and kind of food, drinking the proper kind and amount of water, the wearing of proper clothing to suit the temperature, the breathing of wholesome air, all of which tend to heighten resistance; the avoidance of habits and practices which are liable to contract or transmit infectious diseases such as those borne by the mouth, nose, intestinal, venereal discharges, etc.; the proper use of the eyes, etc. Cleanliness of the person and the clothing is one of the first requisites for good health. The entire body, if practicable, but at least the feet, armpits, and genitals should be bathed daily, and the exposed parts of the body, face, and neck as often as necessary. The hair should be kept cut short, and the finger and toe nails kept trimmed and clean. Dirty bodies and dirty, infected clothing are very often the cause of skin and other diseases. A moderate amount of exercise in the open air should be taken regularly. With proper exercise the elimination of waste products from the body is increased through deeper breathing, and more perspiration; the muscles and heart become better nourished and a better circulation improves all the other functions of the body; the digestion is improved; and resistance to certain diseases is increased. The bowel should move daily, otherwise poisonous substances are absorbed into the system. If proper food is eaten and proper exercise taken, the bowel generally will look after itself. The mental state may affect the health and a cheerful state of mind promotes and benefits all the functions of the body and vice versa.

Not only is the practice of personal hygiene one of the greatest factors in the prevention of disease, but also it is one of the chief aids to the sanitarian in destroying or preventing the transmission of the agents which cause the communicable diseases. Infective discharges from the respiratory tract can be readily transferred to others by promiscuous coughing, sneezing, and expectorating, or by the use in common of towels, drinking cups, and eating utensils. Good personal hygiene will prevent many of the air-borne and hand-to-mouth infections.

Following is a summary of the principles of personal hygiene which are adaptable to naval life:

1. Keep the body clean. Bathe the entire body, or as much of it as possible daily.

2. Keep the hands clean. Always wash them before eating and after leaving the toilet. Keep the fingers away from the nose and mouth, and the fingernails clean and cut short.

3. Keep the feet clean and the toenails cut short and straight across.

4. Change the underwear and socks frequently. Wear socks that are 1½ or 2 sizes larger than the shoe size and shoes that have been fitted carefully.

5. Brush the teeth every morning and evening or after each meal if possible. Have the teeth examined by a dentist at least every 6 months.

6. Eat slowly a moderate amount of nutritious food regularly and drink plenty of pure water.

7. Be regular in going to the toilet for bowel actions.

8. Take a moderate amount of exercise in the open air regularly. Breathe deeply at all times.

9. Sleep in a well-ventilated place with plenty of fresh air.

10. Avoid excesses of any kind, but especially alcoholic drinks and promiscuous sexual intercourse. If exposed to venereal infection immediately use prophylaxis.

11. Avoid persons with colds or coughs and keep away from others when suffering with one. Cough and sneeze in a handkerchief.

12. Avoid unnecessary exposure to extremes of weather. Change into dry clothes as soon as possible after getting wet, and dry the wet clothing before stowing it away. Clothing wet with perspiration should be dried and, if possible, washed before being stowed away.

13. Avoid using the toilet or other personal articles of others and do not allow others to use one's own.

14. Be cheerful.

The precautions regarding the care of the hands and fingers are of particular importance for the majority of infections are taken into the body through the mouth, and the hands are responsible for a large number. Likewise the principle pertaining to "colds" should be closely observed. Finally, if there is one basic law, it is to avoid excesses of any kind (Handbook, Hospital Corps, 1939).

Chapter VIII

PREVENTIVE MEDICINE

In general, preventive medicine has for its objective the control or prevention of disease and the conservation and maintenance of health. In the Navy it is similar in its scope to public health activities of civilian communities, except insofar as it is modified, of necessity, by conditions peculiar to the Navy. These modifying conditions are mainly those resulting from factors of environment accompanying naval activities under restrictions imposed by the nature of the service.

The following references in the Navy Regulations pertain to the duties of the commanding officer of a naval vessel in relation to preventive medicine:

1. Provisions (art. 20 (7), N. R.).
2. Health of crew (art. 20 (8), N. R.).
3. Care of crew (art. 843, N. R.).
4. Service on unhealthy stations (art. 901, N. R., see art. 741, N. R.).
5. Effects destroyed to prevent spread of disease (art. 916, N. R.).
6. Cleanliness (art. 1319 (1), N. R.).
7. Precautions as to health of the crew (art. 1319 (2), N. R.).
8. Clothing (art. 1319 (3), N. R.).
9. Bedding (art. 1319 (4), N. R.).
10. Allowance of water (art. 1319 (5), N. R.).
11. Inspection and use of fresh food, etc. (art. 1320 (2), N. R.).
12. Food and water (art. 1320 (5), N. R.).
13. Athletic exercises (art. 1323 (1), N. R.).
14. Bumboats and traffic (art. 1323 (3), N. R.).
15. Harbor water (art. 1324, N. R.).
16. Disposal of refuse (art. 1337, N. R.).
17. Leave to enlisted men (art. 1731 (1), N. R.).
18. Unserviceable and unsanitary articles (art. 1910 (1), N. R.).
19. Clothing and personal effects of officers and men (art. 1925, N. R.).

HEALTH RECORDS

These records, if aboard, should be checked at intervals, once each quarter, to see that there is one for each member of the crew, that they have received the required protective inoculations against smallpox and typhoid fever, and that any belonging to men who have been transferred are forwarded to the proper activity.

FOOD

Regular inspections should be made of the issue room, galley, etc., to observe and correct any unsatisfactory condition regarding the storage, handling, preparation, and serving of food, special attention being given to foods liable to become culture media for bacteria—meats and meat products, fish and shellfish, milk and milk products, salad ingredients, and cream fillers.

FOOD HANDLERS

Cooks, butchers, bakers, helpers, and messmen must be required to keep their hands, as well as utensils and implements used in the preparation and serving of foods, scrupulously clean. Sufficiently close supervision should be maintained over the health of food handlers to insure prompt detection of infectious disease, including venereal infection.

UTENSILS AND MESS GEAR

Cooking utensils should be washed thoroughly with hot water and soap or other cleansing agent after use and after application of mechanical or chemical polishing agents. Mess gear should, after each meal, be washed sufficiently to remove adherent particles of food and mouth secretions, sterilized, and allowed to dry without wiping. The minimum safe sterilization requirement is submersion in, or equivalent exposure to, water at a temperature above 180° F. for not less than 1 minute.

WATER

The evaporation of water, either at atmospheric or reduced pressures and temperatures, is a physical separation of water from its dissolved and suspended constituents, including bacteria. Low pressure and temperature evaporation can produce even from contaminated water as reliable and sterile an effluent as high temperature distillation if raw water does not prime or leak into it. The salinity of the distilled water may be watched as an index of operation and the standard of 0.25 grain per gallon should be maintained if possible. If the salinity exceeds 0.5 grain per gallon the water should be discarded and not pumped into the ship's tanks. When reliable information regarding the sanitary quality of water taken aboard at a dock or from a water boat is not available the water should be passed through the ship's distiller. Water from Gatun Lake or other fresh-water lake in the Canal Zone should always be so treated.

The average minimum actual consumption of fresh water per person on board ship required in the interests of personal hygiene

is about 12 gallons per day. Arbitrary limitation of hours during which washrooms are open for use, or restriction of members of the crew to definite small quantities of water for bathing and washing clothes tend to result in serious breaches of hygiene. If unusual circumstances require drastic restrictions in the use of fresh water the allowance should be not less than two full buckets per man per day for the general crew and not less than four buckets for men of the engine room, fireroom, and shop forces.

Scuttle-butt terminals should be kept in good condition and at a slight angle so that water does not fall back on the outlet. Valve handles, like door knobs, may be an important indirect means of transmitting the causative agents of communicable disease. This can be obviated by the use of a foot-controlled valve. Under epidemic conditions they should be frequently disinfected and disinfectant solution provided for hands. In places where sanitary scuttle-butts are not available suitable arrangements must be made to prevent the use in common of drinking cups or glasses.

VENTILATION

Living compartments, offices, and work spaces are to be kept in the comfort zone insofar as weather conditions permit. Ventilation ordinarily is effected by supply and exhaust blowers, electric fans, and by natural means.

In cool and cold weather adequate ventilation requires a sufficient quantity of air flowing through a given space to keep the air reasonably free from harmful substances and disagreeable odors. In hot weather the volume of air required for the removal of excess heat is so great that other ventilation factors usually become inconsequential. Exhaust-system blowers are required for rapid removal of overheated or malodorous air from compartments in which good ventilation cannot otherwise be maintained. Both supply and exhaust systems are considerably reduced in efficiency by accumulation of dirt in ducts and upon screens.

Compartments which have been closed for some time, or those which have been sealed, should not be entered until after they have been well ventilated and the air tested by a lighted candle. If the flame is extinguished the air is unsafe. Men should not descend into such compartments without having a life line attached to them and carefully guarded.

GARBAGE

Garbage is unsightly and usually malodorous. By attracting flies or rats it may indirectly menace health. When prompt disposal is not possible cans with well-fitting covers should be used. With an

unusual number of cans in use it is difficult to keep them in satisfactory sanitary condition. To avoid nuisance base-force arrangements should be made in advance for daily disposal.

Accumulations of refuse below decks increase fire hazards and have a certain bearing on health by inviting expectoration (article 1337 N. R.). Dock garbage and refuse platforms must be properly used and kept clean by ship's forces. Good sanitary condition at all hours is necessary to limit numbers of flies, roaches, and rodents.

SEWAGE DISPOSAL

Disposal of ship sewage overboard by salt water carriage offers no sanitary problem except the pollution load added to harbor water about the ship. When conditions are otherwise favorable and swimming is permitted, discharge of sewage from the side on which men are in the water should be discontinued at least one-half hour before swimming call is sounded.

LIGHTING

Hygienic lighting connotes adequate illumination, general and focal, with freedom from glare, troublesome shadows, and annoying high lights, to permit reading, writing, required work, or other activity to be performed without avoidable eyestrain. The most important single fundamental factor in lighting is brightness contrast. Adequate general illumination permits sufficiently deep vision into shadows in all parts of the room or compartment so that in glancing up from work the iris will not dilate widely and contract suddenly upon turning back to the work in hand. Moving shadows and flickering light should be prevented. Glare is direct when a source of light comes within the field of vision with the eyes focused upon work, and indirect when light from source is reflected to the eyes by the work or some adjacent object. In general, glare is troublesome if the work itself is not brighter than other objects in the field of vision. Focal lights while undesirable are often necessary. Such lights should ordinarily be placed directly over the work if the plane of work is horizontal; otherwise the location should be such as to afford the best view of the details of the work, while avoiding as much as possible under illumination, glare, and troublesome shadows. Too great concentration at one point in the work field will result in tremendous eyestrain from glare, shadows, and high lights. Places where falls may occur should be adequately illuminated. Focal illumination should be provided for band saws, lathes, grinders, and cutting, mixing, and chopping machines. A sufficient number of lights of adequate candlepower should be main-

tained in crew's compartments for reading and writing. Individual lights used in focal illumination should be so placed that light rays will not enter directly into the eyes of the worker.

ACCIDENT PREVENTION

The majority of accidents are avoidable. Accidents usually occur because someone fails to observe simple precautionary rules or fails to employ well-known safety measures. Dangerous machinery and electric appliances should have adequate safeguards. All passageways should have adequate illumination. Ladders should have hand-rails or lines and open hatches should have substantial guards. The Bureau of Ships' Construction and Repair Manual contains much valuable information on safety measures and appliances.

SWIMMING

Caution should be taken, especially when the temperature of the water is below 70° F., to recall men who, not reacting well in the water, develop cyanosis and severe shivering. In the Tropics care should be taken to prevent swimmers from developing severe sunburn. Swimming should not be permitted in water contaminated with sewage.

Chapter IX

QUARANTINE, DISINFECTION, AND BILLS OF HEALTH

QUARANTINE

The term "quarantine" has its origin from the Italian *quaranta*, meaning 40, this figure representing the number of days for which vessels, beginning early in the fifteenth century, were held under observation on account of the frequent invasions of plague.

The term now means any limitation placed upon the freedom or movement of exposed or contact persons or animals with the object of preventing or controlling the spread of communicable disease. The expression "quarantine methods" is often used to cover all restrictive measures instituted by health officials for the purpose of limiting the spread of disease on land as well as at sea. There is community quarantine when one city or town imposes restrictions upon travelers from some other place in the same country, and border quarantine when the aim is to prevent the introduction of disease over land or across a river from a foreign country. Interstate quarantine is enforced by the Federal Government through the agency of the United States Public Health Service, and consist of routine and special activities planned to limit the spread of disease incident to interstate travel and traffic.

Maritime quarantine includes all measures undertaken by the Government to prevent the introduction of disease through seaports.

The first quarantine station was established at Venice in 1403, on a small island adjoining the city, and had as its basic idea the blind application of the theory of isolation to prevent the spread of plague. Today quarantine stations are to be found in the principal ports of the world at which scientific and accurate periods of detention are in use to prevent the ingress of certain threatened diseases. From the earliest days until the determination of the exact modes of transmission and periods of incubation of the quarantinable diseases, quarantine consisted in more or less rigorous periods of detention, even up to 100 days, with the expectation that in this time the disease, if present, would "wear itself out," or that the "effluvium" would be removed by the influence of sun, rain, frosts, or snows. This haphazard quarantine was extremely expensive, proceeding at times even to burning the entire ship and cargo.

Modern methods of quarantine both on land and sea are based upon known modes of transmission and periods of incubation of certain diseases which are classed as quarantinable. The studies of the last 30 years have established that many diseases, including all of those known as quarantinable, are due to certain microorganisms or viruses with definite habits of life and capable of growth and multiplication. These so-called pathogenic (disease producing) organisms or viruses may be carried from individual to individual by direct contact with a person sick of the disease or by a carrier, a "carrier" being a person who harbors a pathogenic organism without showing evidence of the disease; they also may exist a relatively short time in or on other than living material as in water, milk, or other food, or they may be transmitted from one human being to another by an intermediary living agent or "vector," as the body louse in typhus, the mosquito in yellow fever, and the flea in transmitting plague to the human being from an infected rat.

After having invaded or attacked a healthy individual, the germs either die or survive. If the latter, a certain number of days must elapse before they have multiplied to sufficient numbers to produce symptoms of disease. This interval of time is known as the period of incubation. This period of incubation varies in length for the different diseases, as well as for the same disease within certain well-defined limits. The period of detention or observation in quarantine is based upon the maximum number of days within which experience has shown the suspected disease will manifest itself if present.

The absence of sickness in the personnel of a vessel does not necessarily mean an absence of infection aboard the vessel. This can be readily understood when it is remembered that a healthy person may carry or harbor the germs of a disease in his body, as, for instance, a cholera carrier, or that the intermediary host may be present without actually coming in contact with the crew, as, for instance, plague-infected rats in cargo under battened hatches. In either event possible contact with an individual on ship or ashore might mean the beginning of an epidemic. It is therefore clear why a vessel may be detained in quarantine, even though there be no sickness among crew or passengers.

The United States Government has declared the following diseases to be quarantinable and subject to quarantine under the provisions of the United States quarantine laws and regulations of the Federal Security Agency, enforced by the United States Public Health Service:

1. Cholera, period of incubation 1 to 5, usually 3 days.
2. Yellow Fever, period of incubation, 3 to 6 days.
3. Smallpox, period of incubation 8 to 16 days.

4. Typhus Fever, period of incubation 5 to 20 days.
5. Leprosy. If the patient is an alien, not permitted to land; if a citizen, the case is dealt with according the State laws of the port of entry.
6. Plague, period of incubation 3 to 7 days.
7. Anthrax, period of incubation 7 days.

REQUIREMENTS AT FOREIGN AND INSULAR PORTS

Vessels leaving foreign ports and ports in the possessions or other dependencies of the United States for ports in the United States or its possessions or other dependencies are subject to inspection by the officer issuing bills of health whenever, in his opinion, such inspection is necessary to the issuance of a bill of health. United States Quarantine Laws and Regulations require that an inspection be made of—

(a) All vessels from ports at which cholera, yellow fever, or plague in men or rodents prevail, or at which smallpox or typhus fever prevails in epidemic form, and at which a medical officer is detailed.

(b) All vessels carrying steerage passengers; but if sailing from a healthful port, the inspection need include only such passengers and their living apartments. (See paragraph under General Requirements of the United States Public Health Service at foreign and insular ports.)

Inspection of the vessel is such an examination of the vessel, cargo, passengers, crew, personal effects of same, including examination of manifests and other papers, food and water supply, the ascertainment of its relations with the shore, the manner of loading, and possibilities of invasion by rats and insects as will enable the inspecting officer to determine if these regulations have been complied with.

When an inspection is required, it should be made by daylight, as late as practicable before sailing. The vessel should be inspected before the passengers go aboard, the passengers just before embarkation, and the crew on deck, and no communication should be had with the vessel after such inspection except by permission of the officer issuing the bill of health.

Vessels, prior to stowing cargo or receiving passengers, should be mechanically clean in all parts, especially in the hold, forecabin, and steerage, and loose dunnage in unladen compartments shall be so arranged as to prevent harborage of rodents.

Any portions of the vessel liable to have been infected by any communicable disease should be disinfected before the issuance of the bill of health.

The air space, ventilation, food and water supply, hospital accommodations, and all other matters mentioned therein promotive of the health and comfort of the passengers must be in accordance with the

provisions of the act of Congress approved August 2, 1882, entitled "An act to regulate the carriage of passengers by sea."

Bedding, upholstered furniture, soiled wearing apparel, personal effects, and second-hand articles of a similar nature coming from a district known to be infected with smallpox or as to the origin of which no positive evidence can be obtained, and which the consular or medical officer has reason to believe is infected, should be disinfected prior to shipment. Articles similar to the above mentioned, if from a district infected by plague or typhus, should be inspected, and, if necessary, treated to destroy vermin.

Articles from an uninfected district shipped through an infected port may be accepted without restriction if not exposed to infection in transit.

Nothing in these regulations shall be construed to modify or nullify in any way existing restrictions promulgated by the Secretary of the Treasury at the instance of the Secretary of Agriculture for the prevention of the introduction of diseases of animals.

Any article shipped from or through an infected port or place which the consul or medical officer has reason to believe infected, should be disinfected.

Any article presumably infected which cannot be disinfected should not be shipped.

Passengers, for the purpose of these regulations, are divided into two classes, cabin and steerage.

So far as possible passengers should avoid embarking at a port where quarantinable disease prevails, and communication between the vessel and the shore should be reduced to a minimum. In such a port the personnel of the vessel should remain on board during their stay.

No person suffering from a quarantinable disease, or scarlet fever, measles, diphtheria, poliomyelitis (infantile paralysis), influenza, chicken pox, or cerebrospinal meningitis should be allowed to ship.

Passengers and crews, merchandise, and baggage, prior to shipment at a noninfected port but coming from an infected locality should be subject to the same restrictions as are imposed at an infected port.

REQUIREMENTS AT SEA

The master of a vessel should observe the following measures on board his vessel:

(a) The water closets, forecastle, bilges, and similar portions of the vessel liable to harbor infection should be frequently cleansed and disinfected.

(b) Free ventilation and rigorous cleanliness should be maintained

in all portions of the ship during the voyage and measures taken to destroy rats, mice, fleas, flies, mosquitoes, and all vermin.

(c) A patient sick of a communicable disease should be isolated and one member of the crew detailed for his care and comfort, who, if practicable, should be immune to the disease.

(d) Communication between the patient or his nurse and other persons on board should be reduced to a minimum.

(e) Used clothing, body linen, and bedding of the patient and nurse should be immersed at once in boiling water or in a disinfecting solution.

(f) The compartment from which the patient was removed should be disinfected and thoroughly cleansed. Articles liable to convey infection should remain in the compartments during the disinfection when gaseous disinfection is used.

(g) Any person suffering from malaria or yellow fever should be kept under mosquito bars and the apartment in which he is confined closely screened with mosquito netting. All mosquitoes on board should be destroyed by fumigation. Mosquito larvæ (wigglers or wiggle tails) should be destroyed in water barrels, casks, and other collections of water about the vessel by the use of petroleum (kerosene); where this is not practicable, the receptacle should be covered by mosquito netting to prevent the exit of mosquitoes from such breeding places.

(h) In the case of bubonic plague, special measures must be taken to destroy rats, mice, fleas, and other vermin on board, and in case of pneumonic plague, the patient should be isolated, the body discharges disinfected, especially sputum, and the attendant should wear a mask.

(i) In the case of typhus, special measures should be taken to destroy vermin.

(j) In the case of cholera, typhoid fever, or dysentery, the drinking water should be boiled and the food thoroughly cooked. The discharges from the patient should be immediately disinfected and thrown overboard.

An inspection of the vessel, including the steerage, should be made once each day.

Should cholera, yellow fever, smallpox, typhus fever, plague, or any other communicable disease appear on board a ship while at sea, those who show symptoms of these diseases should be immediately isolated in a proper place; the captain should note the same in his log, and all of the effects liable to convey infection which have been exposed to infection should be destroyed or disinfected. In the case of smallpox, the entire personnel should be vaccinated.

The compartment used for isolation should be cleansed as soon as it becomes vacant.

The dead, except those dead of yellow fever, should be enveloped in a sheet saturated with one of the strong disinfecting solutions, without previous washing of the body, and at once buried at sea or placed in a coffin hermetically sealed. (See ch. VI.)

A complete clinical record shall be kept of all cases of sickness on board and the record delivered to the quarantine officer at the port of arrival.

The following disinfecting solution is recommended for use at sea:

Formula for disinfecting

Formalin or Formaldehyde (5 Percent)

| | |
|----------------------------|-----|
| Formaldehyde solution..... | 50 |
| Water | 950 |

REQUIREMENTS AT UNITED STATES PORT

Every vessel subject to quarantine inspection, entering a port of the United States, its possessions or dependencies, shall be considered in quarantine until given free pratique. Such vessel shall fly a yellow flag at the foremast head and shall observe all the other requirements of vessels actually quarantined. (See arts. 1451, 1452, 1453, N. R.)

Vessels arriving at ports of the United States under the following conditions shall be inspected by a quarantine officer prior to entry:

(a) Vessels from a foreign port shall be inspected only at first port of call in the United States, except vessels from ports suspected of yellow fever arriving during the active quarantine season at southern, via northern, ports.

(b) Any vessel with sickness on board.

(c) Vessels from domestic ports where cholera, plague, or yellow fever prevails, or where smallpox or typhus fever prevails in epidemic form.

The inspection of vessels required by these regulations shall be made between sunrise and sunset, except in case of vessels in distress. Exception may also be made in the case of vessels carrying perishable cargoes, and regular line vessels under regulations approved by the Secretary of the Treasury.

In making the inspection of a vessel the bill of health and clinical record of all cases treated during the voyage, crew and passengers' lists and manifests, and, when necessary, the ship's log shall be examined. The crew and passengers shall be mustered and examined and compared with the lists and manifests and any discrepancies

investigated. The clinical thermometer should be used in the examination of the personnel of vessels under suspicion. When a freight manifest shows that articles requiring disinfection under these regulations are carried by the vessel, a certificate of disinfection, signed by a United States consul or a medical officer of the United States, shall be exhibited and compared with same. If no certificate of disinfection is produced the collector of customs at the port of entry shall be notified of same by the quarantine officer. The collector of customs shall then hold such consignment in a designated place, separate from other freight, pending the arrival of the certificate of disinfection; and in the event of its nonarrival the articles shall be disinfected as hereinbefore prescribed, or shall be returned by the common carrier conveying same.

Medical officers of the United States duly clothed with authority to act as quarantine officers at any port or place within the United States, when performing the said duties, are hereby authorized to take declarations and administer oaths in matters pertaining to the administration of the quarantine laws and regulations of the United States (Act of March 2, 1901, sec. 12).

No person, except the quarantine officer, his employees, or pilots, shall be permitted to board any vessels subject to quarantine inspection until after the vessel has been inspected by the quarantine officer and granted pratique, and all of such persons so boarding such vessel shall, in the discretion of the quarantine officer, be subject to the same restrictions as the personnel of the vessel, or otherwise action may be taken as provided for in section 10, act of March 2, 1901, provided, however, that the United States customs officials may be permitted to board a vessel that has been inspected and held in quarantine for detention or treatment, they being subject to the same restrictions as the personnel of the vessel.

When a vessel arriving at quarantine has on board any of the communicable but nonquarantinable diseases the quarantine officer shall promptly inform the local health authorities of the existence of such disease aboard and shall make every effort to furnish such notification in ample time, if possible, to permit of the case being seen by the local authorities before discharged from the vessel.

QUARANTINE DETENTION

Vessels arriving under the following conditions shall be placed in detention:

(a) With quarantinable disease on board or having had such disease on board during the voyage.

(b) Any vessel which the quarantine officer considers infected with quarantinable disease.

(c) A vessel arriving at a port south of the southern boundary of Virginia in the season of active quarantine, April 1 to November 1, from a port infected or suspected of infection with yellow fever.

(d) Vessels arriving at ports north of this line and south of the southern boundary of Maryland between May 15 and October 1, if from a port infected or suspected of infection with yellow fever.

(e) In the case of vessels arriving at a northern port without sickness on board from ports where yellow fever prevails the personnel shall be detailed under observation at quarantine to complete six days from the port of departure.

(f) Towboats and other vessels having had communication with vessels subjected to quarantine shall themselves be quarantined if they have been exposed to infection.

The duration of detention of vessels or personnel herein contemplated will depend upon the quarantinable disease involved and will hereinafter be specifically provided for.

REQUIREMENTS RELATING TO NAVAL VESSELS

Vessels of the United States Navy which carry a medical officer, upon entering United States ports from foreign ports, are exempt from quarantine inspection provided that such vessels have not sailed from a port infected with cholera, yellow fever, or plague, or in which typhus or smallpox is epidemic, and further provided that no cases of these quarantinable diseases have occurred on board en route.

Vessels of the United States Navy may be subjected to quarantine inspection upon arrival at ports of the United States, its possessions, or dependencies when coming from a port known or suspected to be infected with cholera, plague, or yellow fever, or where smallpox, or typhus fever is present in epidemic form, and may be detained in quarantine for such disinfection or disinfection as may be required by reason of disease aboard or exposure to quarantinable disease at the port of departure or call. By arrangement with the Treasury Department, ships of the Navy to which medical officers are attached are ordinarily exempt from quarantine inspection. A certificate furnished by the ship's medical officer as to the sanitary condition of the vessel and record of communicable diseases is accepted by the quarantine officer in lieu of actual inspection. In case pratique is granted by radio communication the medical officer upon arrival in port must forward the bill of health in duplicate to the quarantine officer, together with a statement as to sanitary condition, including number of cases of any communicable disease on board.

Vessels of the United States Navy having entered the harbors of infected ports but having held no communication which is liable to

convey infection may be exempted from the disinfection and detention imposed on merchant vessels from such ports.

Vessels of the United States Navy not carrying a medical officer shall, upon arrival at ports of the United States from foreign ports, be subject to the same provisions of these regulations as apply to merchant vessels.

No vessel from a foreign port is permitted to enter any port of the United States until pratique has been granted by a United States quarantine official. Until pratique has been granted the vessel is in quarantine and can hold no unauthorized communication with the shore. A merchant vessel cannot enter at the customhouse without presenting the certificate of pratique which shows that the vessel has been released from quarantine.

BILL OF HEALTH

Masters of vessels clearing from or leaving any foreign port or any port in the possessions or other dependencies of the United States for a port in the United States or its possessions or other dependencies must obtain a bill of health, in duplicate, signed by the proper officer or officers of the United States as provided for by law, unless there is no such officer at the port of departure, excepting vessels operating during the absence of quarantinable disease in the foreign ports of call, exclusively between ports in the United States and ports in Canada, and exclusively between ports in Florida south of 28° north latitude and ports in the Bahama Islands and ports in Cuba. The provisions of this section shall not apply to vessels plying between foreign ports on or near the frontiers of the United States and ports of the United States adjacent thereto; but the Secretary of the Treasury is hereby authorized, when, in his discretion it is expedient for the preservation of the public health to establish regulations governing such vessels. Vessels sailing originally from other foreign ports and merely calling at Canadian ports enroute to the United States are not exempt from the provisions of section 2 of the act approved February 15, 1893. During the prevalence of any of the quarantinable diseases at the foreign port of departure, vessels above referred to are required to obtain from the consular officer of the United States, or from the medical officer of the United States, when such officer has been detailed by the President, a bill of health, in duplicate, in the form prescribed by the Secretary of the Treasury. Guantanamo Bay, Cuba, is considered under the law as a foreign port. A bill of health is required and may be obtained from the medical officer prior to departure. (See art. 1172 N. R. and G. O. 25.) Naval vessels clearing from one United States port for another

United States port do not ordinarily procure a bill of health for presentation at the port of arrival. Local or State authority at the port of arrival may, however, require the exhibition of a bill of health under special circumstances, such as when some epidemic disease exists at the port of departure, and under such circumstances it is advisable to procure a bill of health.

A naval vessel departing from a port in the continental United States for a port in the Canal Zone or United States possessions is not required to procure a bill of health or port sanitary statement at such port of departure, except when plague, cholera, or yellow fever exists, or typhus fever or smallpox prevails in epidemic form, in the port of departure.

A naval vessel departing from a port in the possessions or dependencies of the United States for a port in the Canal Zone or other United States possessions is required to procure a bill of health in duplicate at each port of departure.

Bills of health or port sanitary statements are issued in United States ports by medical officers of the Public Health Service where available; otherwise by the collector of customs.

Naval vessels sailing from a United States port to a foreign port shall always procure a bill of health from the proper authorities and have it visaed by the consular or other representative of the country or countries of ports of call, if such ports can be determined upon prior to sailing. It is sometimes advisable to secure bills of health for several ports to which the vessel might go, when definite information of the exact destination is not procurable. A naval vessel sailing from a foreign port to another foreign port shall likewise procure and have visaed a bill of health.

A vessel leaving a foreign port for a home port shall obtain a bill of health from a port official and also a United States consular bill of health, at a port where the issue of consular bills of health is customary, or from the United States Public Health Officer, if one be stationed there.

The form, United States of America bill of health, sets forth under hand and seal of the officer authorized to sign, certification that the vessel has complied with quarantine rules and regulations and leaves the port of issue bound for stated port of the United States via the designated port of call, if any, under circumstances described, including the name of the vessel; nationality; master's name; gross tonnage; net tonnage; medical officer's name; number of officers; number of crew, including petty officers; number of officers' families; number of passengers destined for the United States; number of first cabin, second cabin, and steerage passengers; names of ports visited during the preceding 4 months; statement as to the location

of the vessel while in port—wharf, open bay, distance from shore; character of communication with shore; time the vessel was in port; sanitary condition of the vessel; sanitary measures, if any, adopted while in port; sanitary condition of the port and vicinity; and the names of diseases prevailing at the port and in the vicinity. The form also calls for entering the number of cases and number of deaths from each of the quarantinable diseases during the most recent fortnight for which statistics are available, as well as the date of the last case within the preceding year.

Vessels clearing from a foreign port or from any port in the possessions or other dependencies of the United States for any port in the United States, its possessions, or other dependencies, and entering or calling at intermediate ports, must procure at all such ports a bill of health in duplicate signed by the proper officer or officers of the United States.

Bills of health for naval vessels and indorsement by consular officers are usually extended gratis. Any expense involved in procuring bills of health or in quarantine is a charge against appropriations not under the Bureau of Medicine and Surgery. Quarantine expenses (bills of health and pratique) are a charge against "Instruments and supplies, Bureau of Navigation." (For decision as to the liability of a naval vessel for the payment of quarantine charges growing out of a State law, see Official Opinions of the Attorney General, 1906, vol. 25 p. 234.)

In the United States a bill of health is procured by applying in person to the medical officer of the Public Health Service where available, otherwise to the collector of customs.

In foreign ports request for a bill of health should be made at the office of the captain of the port (*Bureau du Capitaine du Port*, *Offizio dell Capitano del Porto*, *Capitanía del Puerto*).

The person applying for the bill of health should take with him bills of health from last port of departure and be prepared to furnish the necessary data therefor.

If epidemic or contagious diseases are present in the port at the time of making the request, a visit should also be made to the consul of the nationality of the next port of call, particularly in the Mediterranean, for his visas.

On entering port, in addition to the bill of health, the ship shall be prepared to furnish the quarantine officer, if required, with a statement relative to the health conditions prevailing on board ship. Certain diseases of a communicable or infectious character, not included among the quarantinable diseases under the quarantine laws and regulations of the Treasury Department, such as the exanthemata, diphtheria, cerebrospinal fever, etc., will ordinarily be viewed by local or State

authorities as constituting quarantinable diseases and their presence on board should be considered as rendering the vessel subject to quarantine restrictions. All such diseases should be fully reported to the inspecting health officer.

The officer issuing the bill of health to vessels leaving foreign ports and ports in the possessions or other dependencies of the United States for ports in the United States or its possessions or other dependencies is required to satisfy himself, by inspection if necessary, that the conditions certified to therein are true. He is authorized, in accordance with law, to withhold the bill of health until he is satisfied that the vessel, the passengers, the crew, and the cargo have complied with all the quarantine laws and regulations of the United States.

SPECIAL QUARANTINE MEASURES

CHOLERA

This disease is caused by a germ, the vibrio comma, when introduced into the gastrointestinal tract. Food or water indirectly contaminated is the chief means by which the disease is conveyed, but on board ship direct contact or the immediate pollution of alimentary substances by "carriers" or acute cases are to be considered the more common means by which the cholera infection is transmitted. The possibility of water ballast being infected or constituting a probable source of spreading the disease is so remote as to be negligible, and the same applies in a general way to cargo and ship supplies. Accurate knowledge that none of the personnel is harboring cholera organisms in his gastrointestinal tract is the most important feature in the treatment of cholera-infected vessels.

In cholera the control of the human host and the safe disposal of the excreta therefrom, the destruction of contaminated food or water, or their sterilization—cooking, boiling, etc.—are the essential features in preventive measures. Fumigation or place disinfection is not called for in cholera preventive measures. Where a case of cholera has resulted in soiling the bedding, as an added precaution such effects should be sterilized and the floors and walls of the compartment washed down with formaldehyde solution. The cholera vibrio has practically no resistance to drying, however, and under natural conditions it is improbable that soiled linen or an infected place will result in the spread of the disease. While bathing and personal cleanliness is to be encouraged at the quarantine station, it is not to be assumed that disinfection of wearing apparel and personal effects of the contacts or the disinfection of the body has any material effect in preventing the spread of the infection. The control of the personnel and the assured safe disposal of body discharges and protection of

food and water supply are the important features to be observed in the prevention of cholera.

MEASURES AGAINST CHOLERA AT FOREIGN AND INSULAR PORTS

At ports where cholera prevails special care should be taken to prevent the water and the food supply from being infected. The drinking water, unless of known purity, should be boiled and the food thoroughly cooked and protected against contamination by flies, etc.

The latrines of vessels must be so arranged that they, including their discharge pipes, can be made and kept mechanically clean.

Certain food products that are ordinarily consumed in an uncooked state coming from cholera-infected localities or through such localities, if exposed to infection therein, should not be shipped. Vegetables ordinarily eaten in an uncooked state when grown in districts where cholera prevails shall not be shipped. Fruits grown on trees or on shrubs may be shipped.

The baggage of steerage passengers shall be inspected, and no food shall be taken aboard in such baggage.

Steerage passengers and crew coming from cholera-infected districts should be subjected to bacteriological examination or otherwise detained 5 days in an environment known to be free from any source of infection.

Steerage passengers and crew from districts not infected with cholera, shipping at a port infected with cholera, unless passed through without danger of infection, should be treated as those in the last paragraph.

Cabin passengers coming from cholera-infected districts should produce satisfactory evidence as to their exact place of abode during the 5 days immediately preceding embarkation. If it appears that they have been exposed to infection, they shall be detained under medical supervision a sufficient time to cover the period of incubation since last exposure, or otherwise be subjected to bacteriological examination.

Should cholera appear in the barracks or houses in which passengers are undergoing detention, no passengers from said houses or barracks who have been previously exposed to this new infection should embark until they have been determined free of the infection by bacteriological examination or otherwise isolated for a period of 5 days.

MEASURES AGAINST CHOLERA AT DOMESTIC PORTS

Special measures shall be employed against vessels and persons from a cholera-infected place, as likewise when cholera has appeared on board during the voyage.

All steerage passengers arriving at ports in the United States, its possessions or dependencies, from ports or places where cholera pre-

vails, shall be subjected to bacteriological examination and shall not be admitted to entry until it has been determined by said examination that they are free from cholera vibrios.

All persons on vessels upon which cholera has appeared during the voyage shall upon arrival at quarantine be detained until it has been determined by bacteriological examination that they are free from cholera vibrios.

Persons in detention who are proven by bacteriological examination (performed not less than 24 hours after removal from exposure to infection in cholera case or carrier) to be free from cholera organisms may be discharged from quarantine without further detention.

In lieu of bacteriological examination (and then only when it is impracticable) persons exposed to infection in a cholera case or carrier shall be detained in quarantine five days after being isolated from such case or carrier.

If a case clinically diagnosed as cholera has occurred on voyage, or if bacteriological examination should reveal the presence of infection in any person on board, such infected person or persons should be removed and isolated. All contacts should be segregated in small groups, and no material capable of conveying infection shall be removed from the ship.

Fruits and vegetables from an infected ship, that are ordinarily consumed in an uncooked state, shall be destroyed or rendered harmless by cooking.

The food served to persons in quarantine, unless from a source known to be free from cholera infection, shall be cooked.

The water supply of a vessel detained in quarantine on account of cholera infection, unless determined by bacteriological examination to be free from cholera organisms or the organism *E. coli*, shall be sterilized. Otherwise it shall be discharged after disinfection.

The dejecta of all persons in quarantine on account of cholera shall be disinfected before final disposition, and special precautions shall be exercised in order to prevent the contamination of food or water supply or the spread of the infection through the agency of flies or other insects.

Personal effects contaminated by dejecta from a cholera case or carrier shall be disinfected.

Any part of the ship that has been contaminated by dejecta from a cholera case or carrier shall be washed down with a solution of formaldehyde solution.

Carriers or recovered cases shall not be released from quarantine detention until three bacteriological tests performed on consecutive days shall have been proven to be negative.

Inoculation with cholera vaccine of persons liable to be exposed should be considered because active artificial immunity for about 1 year is probable.

YELLOW FEVER

The causative agent of this disease is a filtrable virus, ordinarily transmitted to man by a species of mosquito; i. e., *Aedes aegypti* and this only after an intrinsic cycle of development in the body of such mosquito, which requires about 12 days. It has been found that a number of mosquitos other than *A. aegypti* are capable of transmitting yellow fever by bite under certain environmental conditions found in and near tropical forests in the complete absence of *A. aegypti*, and it is then called jungle yellow fever. The mosquito can acquire the virus by sucking blood from a patient ill with yellow fever only during the first 3 days of the disease.

Immunes are those who have had yellow fever. One attack confers lasting active immunity for life. Children often have a mild unrecognized attack and are immune thereafter. Passive immunity of brief duration may be conferred by convalescent serum, and artificial active immunity of prolonged duration is now being practiced by the subcutaneous injection of a living virus modified by prolonged passage through chick embryos.

The only procedure that is called for in preventing the spread of yellow fever (aside from the control of the human host) is that for the destruction of mosquitoes, and this is best accomplished by fumigation with sulfur dioxide or hydrocyanic acid gas. Bactericidal measures have no place in the prevention or destruction of yellow-fever infection.

MEASURES AGAINST YELLOW FEVER AT FOREIGN AND INSULAR PORTS

For the purpose of these regulations 6 days shall be considered as the period of incubation of yellow fever.

It is advisable that at ports where yellow fever prevails precautions should be taken to prevent the introduction of mosquitoes, *A. aegypti*, on board the vessel. Water tanks, water buckets, and other collections of water about the vessel should be guarded in such a manner that they shall not become breeding places for mosquitoes. Where the vessel has lain in such proximity to the shore at such places as to render it liable in the opinion of the inspecting officer, to the access of *A. aegypti* measures should be taken to destroy mosquitoes that may have come on board.

Passengers and crew who, in the opinion of the inspecting officer, have been definitely exposed to the infection of yellow fever (i. e., as from a house or locality known to be infected) should not be allowed

to embark for 6 days after said exposure. Those immune to yellow fever are exempt from this provision.

MEASURES AGAINST YELLOW FEVER AT DOMESTIC AND INSULAR PORTS OF ARRIVAL

A vessel aboard which a case of yellow fever has occurred at any time during the voyage shall be treated as follows:

(a) Careful visual and thermometric inspection of all persons.

(b) The sick are to be immediately disembarked, protected by netting against the access of *Aedes* mosquitoes, and transferred to a place of isolation.

(c) Other persons should be disembarked, if possible, and detained under observation for 6 days, dating from the day of last possible exposure.

(d) Persons under observation presenting an elevation of temperature above 37.6° C. (99.7° F.) shall be isolated in a screened apartment.

(e) The ship shall be moored, if possible, at least 200 meters from the inhabited shore.

(f) The ship shall be fumigated for the destruction of mosquitoes before the discharge of cargo, if possible. If a fumigation be not possible before the discharge of the cargo, the discharge of cargo shall be under the supervision of the quarantine officer and may be permitted as follows: By (1) the employment of immune persons for discharging the cargo; or (2) if nonimmunes be employed, they shall be kept under observation during the discharging of cargo and for 6 days, to date from the last day of exposure on board.

A vessel which has lain in such proximity to the shore of a port known to be infected as to render it liable to the access of *Aedes* mosquitoes shall be fumigated and the personnel held in detention under observation for 6 days.

A vessel arriving at a southern port (either direct or by way of a northern port of the United States) which, although coming from an infected port or suspected port, has had neither death nor case of yellow fever on board, either before departure, during the voyage, or at the time of arrival, and which the quarantine officer is satisfied has not lain in such proximity to the shore as to render it liable to the access of *Aedes* mosquitoes, or which has been fumigated under the supervision of an accredited medical officer of the United States immediately before sailing, may, upon arrival at a port of destination in the United States with good sanitary history and in good condition (including the absence of any exposed collection of water in which *A. egypti* might breed) be subjected to the following treatment:

(a) If arriving in 6 days or less, she may be admitted to pratique with or without fumigation, in the discretion of the quarantine

officer, and without further detention than is necessary to complete the 6 days.

(b) If arriving after 6 days, she shall be immediately fumigated (unless previously fumigated at a northern port) and may be admitted without detention.

Vessels from ports infected or suspected of infection with yellow fever, calling at ports south of the southern boundary of Virginia, April 1 to November 1, or at a port north of that line and south of the southern boundary of Maryland, between May 15 and October 1, for bunker coal or supplies during the active quarantine season, may be allowed to take on such cargo after fumigation, provided the vessel be anchored in a place inaccessible to *Aedes* and the crew or passengers be detained on board.

Traffic without detention may be allowed during the active quarantine season from ports infected or suspected of infection with yellow fever to ports in the United States south of the southern boundary of Maryland under the following conditions:

(a) The vessel must lie at approved moorings in the open harbor; the crew must not be allowed ashore at the port of departure. Every possible precaution must be taken to prevent the ingress of *Aedes* mosquitos and their access to the crew.

(b) The officer who must go ashore to contact authorities in an infected port must be immune to yellow fever. Passengers unless immune to yellow fever must have been free from possible exposure to yellow fever for 6 days immediately prior to embarking.

(c) All the above conditions to be certified to specifically by an accredited medical officer of the United States.

All persons who can prove their immunity to yellow fever or who have not been exposed to possible infection of yellow fever may be permitted to land at once.

PLAGUE

This disease is caused by the *Pasteurella pestis*. The bubonic type (called bubonic plague) is the most common form of the disease and is transmitted to man through the agency of rats and mice and their ectoparasites; i. e., fleas. It is primarily and essentially a disease of rodents. It is only accidentally transmitted to the human by means of the fleas which have fed on an infected rodent host and which, having become dislodged and finding no other preferred host available, perforce turn to the human as the only source of blood supply. It is alleged that the bedbug may transmit the disease. In any event, the bedbug would cause only individual cases of the disease and would not be productive of an epidemic or operate to the widespread dissemination of the disease. The bubonic type is not communicable from person to person.

From the foregoing, therefore, it is evident that the treatment of plague-infected vessels calls for the definite destruction of all rodents and their parasites and bedbugs where there have been septicemic types of the disease. While fleas normally have their habitat on their preferred host, it must be borne in mind that these parasites may occasionally be dislodged and temporarily be found in the environment. When rodent infection has actually been demonstrated on board a vessel, consideration should be given to the destruction of rats, mice, and fleas in all parts of the vessel by some disinfecting agent which will penetrate to all parts of the vessel and will be toxic both to animal and insect life. Sulfur dioxide and hydrocyanic acid gas are best adapted for this purpose. When human cases are found on vessels that have acquired their infection en route, indicating the dispersal of infected fleas, it may be advisable that the clothing and personal effects of the passengers and crew be treated for the destruction of any fleas that may have become lodged thereon.

Disinfection for the purpose of destroying bacteria for the prevention of bubonic plague is irrational and unnecessary. General preventive measures also include: Methodical destruction of rats and other rodents living in the wild state in area of endemic rodent infection; examination of carcasses for the detection of plague; rat-proofing of buildings and elimination of breeding places; guarding of grains and other food materials against access to rats; investigation of all deaths during an epidemic, with autopsy and laboratory examination when indicated. Passive immunity of 3 to 4 weeks' duration is conferred by antiplague serum. Plague vaccine usually confers active immunity of about 6 months' duration.

The pneumonic type (called *pneumonic plague*) is intensely communicable during the course of the disease; susceptibility is general; it is transmitted solely through personal contact in the same fashion as pneumonia or other respiratory diseases. Neither the flea nor other insects are concerned in the direct transmission of pneumonic plague. From an epidemiological standpoint and as to the application of preventive measures, pneumonic plague and bubonic plague are to be considered wholly separate diseases.

MEASURES AGAINST PLAGUE AT FOREIGN AND INSULAR PORTS

At ports or places suspected of plague infection in rodents every precaution shall be taken to prevent rats, mice, and fleas from getting aboard.

Vessels sailing from such ports shall be simultaneously fumigated in all parts, preferably when empty, for the destruction of rats.

Lighters should be free of rats, and this is best accomplished by periodic fumigation.

If the vessel lies at a dock all connecting lines should be guarded by inverted cones or disks not less than 3 feet in diameter and so fixed as to be always at a right angle to the line to which it is attached.

Articles which harbor or are liable to harbor rats or rat fleas should not be shipped until freed of such vermin, either by the use of chemicals, fumigation, or by preventing the access of rats. The nature of the merchandise and the place and method of stowing prior to shipment must be considered in determining its liability to be a rat or vermin carrier, thus: Crated cargo, bags of grain, etc., so stowed as to be used as nesting places for rats would be flea, and might be rat, carriers, and cargo should preferably have been previously stored in ratproof warehouses. Articles of cargo in open crates should be carefully inspected to determine freedom from rats and, at the discretion of the inspector, may be rejected for shipment if considered as rodent infested. When the cargo of a vessel consists of grain or other rat food, extra precautions should be taken to prevent rats from going aboard.

MEASURES AGAINST PLAGUE AT PORT OF ARRIVAL

Ships on which plague has occurred in men or rodents shall be detained in quarantine, the sick, if any, shall be removed and isolated, and the destruction of rats shall be effected as soon as practicable.

A plague-infected ship shall be fumigated simultaneously in all parts for the destruction of rats, including those that may be within articles of cargo, and other precautions shall in the meantime be observed to prevent the escape of rats from the ship.

All rodents destroyed on vessels at quarantine, shall when practicable, be bacteriologically examined.

All persons sick of plague shall be detained in quarantine until well, but no detention of healthy contacts is contemplated (except in the pneumonic type of the disease), other than is incidental to the treatment of vessels or cargo.

If pneumonic plague has occurred on board ship during the voyage, the sick shall be removed and isolated and all crew and passengers that have been exposed to the infection shall be detained in quarantine for a period of 7 days, or, at the discretion of the quarantine officer, until their secretions shall be proved to be free from *P. pestis*.

The quarantine officer, before granting pratique to a vessel that has been detained in quarantine on account of plague infection, shall assure himself that the vessel is free from rats and vermin.

The personal effects in use and the belongings of crew and passengers which in the opinion of the quarantine officer are considered as infected shall be disinfected and rendered free from vermin.

Vessels from foreign ports or ports in the possessions or dependencies of the United States or domestic ports that are known or suspected of being infected with plague may, when loaded with cargo the nature of which or manner of storage precludes effective fumigation, be permitted to enter subject to the terms of a provisional pratique. When lying alongside wharf or dock at United States ports such vessels shall take proper precautions to prevent the passage of rodents. The vessel shall be fended off from wharf or dock not less than 4 feet, and on all connecting lines shall be fixed rat guards of sheet metal of an approved design not less than 3 feet in diameter. All cargo nets and similar devices extending between the vessel and shore structures shall be removed at night unless in actual use, as likewise gangways and ladders, unless guarded. Any vessel so entering and neglecting to effectively apply such measures may, at the discretion of the Surgeon General, be remanded to the quarantine station for discharge of cargo or required to discharge cargo at anchor well removed from the wharf.

Vessels from ports known to be infected with plague in man or rodents which have docked or which have not taken precautions necessary to prevent the ingress of rats and on which effective measures have not been taken to destroy the same under the supervision of an accredited medical officer of the United States Government shall, upon arrival at a port in the United States, be fumigated for the destruction of rats.

All vessels engaged in trade with foreign ports shall be fumigated not less than once every 6 months for the purpose of destroying rats. This is best done when the vessel is empty. The periods may be extended for vessels plying regularly between ports not infected with plague and for vessels whose construction does not favor harborage of rats.

A certificate signed or visaed by an accredited medical or consular officer of the United States may be accepted by the quarantine officer as competent evidence as to the last fumigation, provided such certificate contains the same, or substantially as complete information as contained in Certificate of Fumigation, United States Public Health Service, Form 1939 or Form 1945.

In applying plague-preventive measures vessels without cargo shall be fumigated simultaneously in all parts with sulfur-dioxide gas, not less than 3 pounds per 1,000 cubic feet, for 6 hours' exposure, or by hydrocyanic-acid gas in the proportion of 5 ounces of sodium cyanide per 1,000 cubic feet of space (or equivalent amount of potas-

sium cyanide) for 2 hours. If the vessel be loaded, the time of exposure shall be doubled.

When necessary in the treatment of infected vessels, the quarantine officer may require the master to partially discharge cargo for the purpose of effective performance of fumigation.

SMALLPOX

The causative agent of this disease is a specific filtrable virus and for all practical purposes it may be considered that more or less intimacy of contact is essential for the spread of the disease. It should also be borne in mind that immune contacts or convalescents may transmit the virus in either their clothing, their personal effects, or possibly in the body secretions.

MEASURES AGAINST SMALLPOX AT FOREIGN AND INSULAR PORTS

For the purpose of these regulations 14 days shall be considered as the incubation period of smallpox.

Passengers and crew coming from districts where smallpox prevails in epidemic form, or who have been exposed to smallpox, should be vaccinated before embarkation, unless they show satisfactory evidence of having acquired immunity to smallpox by previous attack, or successful vaccination within 1 year, and their baggage inspected and, if necessary, disinfected.

MEASURES AGAINST SMALLPOX AT PORT OF ARRIVAL

Vessels arriving with smallpox on board, or having had smallpox on board during the voyage, shall be treated as follows:

- (a) The sick shall be removed and detained until recovered.
- (b) All persons who in the opinion of the quarantine officer have been exposed to the infection shall be vaccinated, unless protected by a previous attack of smallpox, and detained in quarantine until the vaccination is protective against said exposure or, if they refuse vaccination, detained in quarantine for 14 days after last exposure to the infection.
- (c) Those persons that have not been exposed to the infection may be released.
- (d) All personal effects of passengers and crew that have been exposed to infection shall be disinfected. All compartments that have been exposed to the liability of infection shall be disinfected.

TYPHUS FEVER

The causative organism of this disease is believed to be a microorganism known as the *Rickettsia prowazek*. The transmitting agent

of typhus, however, is the louse, both the body louse and the head louse, chiefly the former, and in some outbreaks, fleas.

Rats, as well as infected persons, may be a transmission factor and their destruction is therefore an indicated general measure of prevention, along with the operation of facilities for the delousing of persons, clothing, and premises. No other natural means of transmission of typhus infection has been accepted.

The important feature in typhus-preventive measures is the assured destruction of all vermin on the person, clothing, and personal effects of those actually sick with typhus and those who have been in contact with typhus-infected persons. In this latter group are to be included those persons from a known typhus-infected area. The destruction of lice on clothing is best effected by heat, steam under pressure by preference, but flowing steam without pressure will suffice, provided the articles to be disinfected are not closely packed. Dry heat is likewise effective. Body lice and head lice can very well be destroyed by mechanical cleaning—soap and hot water. Then follow the treatment given in the paragraph on the treatment of vermin. The treatment of personal effects and baggage of verminous persons is necessary, but in the case of those individuals who are passed free of vermin and not requiring disinfection their baggage likewise should be passed without treatment. Bactericidal measures are not called for in typhus prevention. The question is solely that of the destruction of lice and rat fleas and the detention in quarantine for a period of 12 days of those persons who have been intimately exposed to typhus infection and who presumably may develop the disease, as well as those actually sick.

MEASURES AGAINST TYPHUS FEVER AT FOREIGN AND INSULAR PORTS

For the purpose of these regulations 12 days shall be considered as the period of incubation for typhus fever.

Passengers and crew from ports infected with typhus shall not be allowed to embark unless demonstrably free from vermin, or otherwise treated for the destruction of vermin. The personal effects, wearing apparel, and baggage of those infested with vermin shall be disinfected.

Passengers from localities where typhus prevails embarking at a port not infected with typhus shall be treated as in the preceding paragraph.

Passengers and crew who, in the opinion of the inspecting officer, have been definitely exposed to infection (from a house, barracks, or other building in which has occurred a case of typhus) shall not be allowed to embark until 12 days after removal from the infected environment.

MEASURES AGAINST TYPHUS FEVER AT PORT OF ARRIVAL

Vessels on which typhus infection has occurred shall be detained in quarantine and the sick, if any, removed and isolated. The clothing, personal effects, and baggage of those infected and of those not demonstrably vermin free shall be treated for the destruction of vermin.

All persons found to be vermin (louse) infested shall be treated for destruction of lice.

All passengers and crew that have been exposed to the infection shall be detained under observation for a period of 12 days from last exposure to infection.

Those of the personnel that are demonstrably free from vermin and have not been exposed to the infection may be released without detention or disinfection of baggage.

Vessels on which typhus has appeared shall be detained and fumigated for destruction of vermin.

Cargo compartments of typhus-infected vessels need not be fumigated unless there be exceptional conditions that may render them vermin infested.

Sulphur dioxide and hydrocyanic acid gas are effective agents for the destruction of lice when used in proper strength and exposure, but must only be used under the supervision of the U. S. Public Health Service or a naval doctor.

LEPROSY

The causative agent of this disease is believed to be *Mycobacterium leprae*, which is an "acid fast" bacillus found in the tissues of persons having the disease.

The incubation period is long and may extend to several years. The conditions and circumstances under which transmission occurs are not completely understood and preventive measures are confined almost entirely to the isolation and segregation of the leprous persons.

For the prevention of the spread of leprosy, the chief and practically the only measure called for is the isolation of the patient, either in a national or State leprosarium. When in temporary confinement at the quarantine stations, when traveling, or under other conditions that would entail contact with the public, especial precautions would include the sterilization of eating utensils used by the leper and the disinfection of bedclothes. Terminal disinfection consists of thorough cleansing of the patient's living premises. No immunization method is recognized and quarantine of contacts is not contemplated.

Alien lepers are not permitted to embark at a foreign port for a port of the United States, its possessions or dependencies, either as a passenger or as a member of the crew, or if discovered on board, the

case shall be certified as a leper and reported to the nearest commissioner of immigration. If the leper be a citizen of the United States, the case shall promptly be reported to the Navy Department, if transportation in a naval vessel is involved.

ANTHRAX

Quarantine regulations contemplate that anthrax is primarily a disease of animals, not transmitted from man to man, and that responsibility for exclusion of the disease rests upon the United States Bureau of Animal Industry. It was designated a quarantinable disease to afford additional protection from infection from imported animal products, especially hair and bristles for shaving brushes. It is required that shaving brushes destined for shipment to the United States be made only from hair or bristles known to be free from anthrax spores, or that such hair or bristles before being made into brushes shall be disinfected by one of three methods: (1) Boiling for 3 hours; (2) autoclaving for 30 minutes at 15 pounds pressure with preliminary vacuum of at least 10 inches; and (3) exposure to streaming steam for 6 hours.

DISINFECTION AND FUMIGATION

The distinction between disinfection and fumigation must be kept clearly in mind. Disinfection properly applied is of great value in the prevention of communicable diseases. With the destruction of infective discharges and the exercise of great care and cleanliness throughout the course of a communicable disease there is less need for terminal disinfection. The boiling of sheets, pajamas, towels, and similar articles and a thorough scrubbing of the surfaces with hot water and soap, and disinfecting of bedding with steam is a more effective method of disinfection than by the use of one of the gaseous agents. Gaseous fumigation for the bacterial viruses had been discontinued as a sanitary measure. Gases, such as formaldehyde, are uncertain in practice and have the merest surface action but they cannot be depended on against tuberculosis or diphtheria. Fumigation has its place in preventive medicine and is used principally for the destruction of rodents in the control of plague, the extermination of insects, especially bedbugs, and, in exceptional instances, for the extermination of mosquitoes as a disease-prevention measure.

The agents used in disinfection are of two types, physical and chemical.

PHYSICAL DISINFECTANTS

Cleansing with soap and water.—The liberal and energetic use of soap and hot water will mechanically remove a high percentage of

bacteria from the hands as well as from contaminated articles such as furniture, door knobs, bed frames, and all washable materials. Consequently, this measure is always to be carried out thoroughly preliminary to or in connection with other methods of disinfection.

Exposure to direct sunlight in fresh outdoor air.—Such exposure for several hours is always desirable, particularly for clothing and bedding and other articles which may not, or in the particular instance need not, be treated more energetically. Bright sunlight which has not penetrated a glass window, and hence had the ultra violet rays filtered out, will kill the common disease producing bacterial organisms in a few hours. Also these organisms cannot withstand the complete drying that takes place in the fresh air. The tubercle bacillus, the virus of chickenpox, the virus of smallpox, and, in general, all spore-bearing bacteria are more resistant to sunlight and drying. Thirty hours of sunning is usually required to kill an anthrax spore.

Burning.—Of unquestioned efficacy, but seldom required.

Boiling.—Very efficient and of wide range of applicability. The articles must be wholly immersed for not less than 10 minutes in water actually boiling (100° C.). The addition of 1 percent of carbonate of soda renders the process applicable to polished steel, cutting instruments, or tools.

Steam.—(a) Flowing steam (not under pressure): Flowing steam when applied under suitable conditions is an efficient disinfecting agent. The exposure must be continued 30 minutes after the temperature has reached 100° C.

(b) Steam under pressure without vacuum: Steam under pressure will sterilize, provided that the process is continued 20 minutes after the pressure reaches 15 pounds per square inch. The air must be expelled from the apparatus at the beginning of the process. If impracticable to obtain the designated pressure, a longer exposure will accomplish the same result.

(c) Steam under pressure with vacuum: Steam in a special apparatus with vacuum attachment is the best method of applying steam under pressure, the object of the vacuum apparatus being to expel the air and to promote the penetration of the steam. The process is to be continued for 20 minutes after the pressure reaches 10 pounds to the square inch.

Clothing, fabrics, textiles, curtains, hangings, etc., may be treated by any of the above methods as circumstances may demand.

Articles injured by steam, such as leather, furs, skins, rubber, trunks, valises, hats and caps, bound books, silks, and fine woolens should not be disinfected by steam. Such articles should be disinfected by formaldehyde gas or any of the chemical disinfecting agents men-

tioned next which may be applicable thereto. Those which will be injured by wetting should be disinfected by a gaseous agent.

Textiles which are soiled with discharges of the sick or which are presumably deeply infected must be disinfected by one of the following methods: (1) Boiling, (2) steam, (3) immersion in one of the germicidal solutions.

Cooking and eating utensils should always be disinfected by immersion in boiling water or by steam. Chloride of lime may be used in an emergency.

CHEMICAL DISINFECTANT SOLUTIONS

Chemical disinfectants not supplied in the medicine box may be obtained from the supply officer for general use aboard naval vessels.

Cresol.—Cresol, a mixture of cresols derived from coal tar, in the strength of 5 percent may be substituted for bichloride of mercury, and should be employed in the disinfection of contaminated clothing or fabrics, on swabs for sides and decks of cabins and living spaces of ships to obviate injurious action on metal surfaces, bright work, etc., and for feces, urine, sputum and spitkits. Exposure should be 1 hour. Fingers should not be immersed in this solution for any length of time as numbness will result and if immersion is continued gangrene may follow. Its action is similar to carbolic acid.

Formaldehyde solution (formalin).—Formaldehyde, a watery solution, containing about 40 percent of formaldehyde gas, may be used in a 5-percent solution as a substitute for bichloride of mercury or carbolic acid and is useful for the disinfection of surfaces, dejecta, fabrics, and a great variety of objects, owing to its noninjurious character. It is an excellent deodorant. Formaldehyde solutions act harshly upon the hands.

Chlorinated lime.—Chlorinated lime in a 5- or 6-percent solution freshly made from the powder which has been kept free from deterioration in a small sealed can or tightly stopped colored bottle is efficient and useful in the disinfection of sewage, stools, glass and earthen ware, and materials or articles which will not be damaged by its bleaching and corrosive action. When the package containing the chlorinated lime is opened there should be a strong odor of chlorine. It can be used for washing painted surfaces and scrubbing floors, in water-closet bowls or urinals, and in shower baths to prevent the spread of ringworm. It serves as a deodorant as well as a disinfectant. It may be used by attendants upon the sick to disinfect their hands. In disinfecting dejecta, stools should be completely covered with the solution, thoroughly mixed and allowed to stand for at least 30 minutes. The powder may be sprinkled over the stool, taking care to add sufficient in excess so that a 5-percent solution will result when thoroughly mixed.

In making a solution for use, one-half pound of commercial chlorinated lime or "bleach" is to be dissolved in a gallon of water. The insoluble residue sinks to the bottom; the solution above contains about 6 percent of chlorinated lime which is equivalent to 2 percent of chlorine, the active disinfecting agent. Chlorinated lime cannot be depended upon to kill the tubercle bacillus.

Disinfection of drinking water by chlorination.—Dissolve the soluble portions of 1 gram of chlorinated lime of tested chlorine strength in a small volume of water and add this to 40 gallons of the water to be disinfected; mix thoroughly and allow to stand for at least 1 hour before using for drinking purposes.

FUMIGANTS

If it should be considered necessary to fumigate, facilities of the United States Public Health quarantine station should be sought, or similar public health facilities, if in a foreign port. In their absence, contact should be made with a naval vessel having a regular medical department.

FUMIGATION OF VESSELS

All spaces to be fumigated must be made as nearly airtight as possible. In fumigating the holds of vessels the hatches should be covered over with their regular waterproof tarpaulins and tightly battened down, leaving a corner that can be opened as a vent for the escape of the fumes. All air slits, scuttles, and chain ports should be closed. Doors should be sealed by means of strips of paper pasted over the cracks left between the frame and the door. All machinery and bright metal should be wiped over with vaseline in advance. All possible care should be observed to see that dead space in the vessel is opened up and all practical measures should be taken to aid in the diffusion of the fumigating gas, and this is especially important when sulfur dioxide is used. Pipe casings should be opened up and from one end of the vessel to the other there should be a certain number of limber boards removed so as to permit of penetration of the gas into the bilges. Any planked-over space between the outer and the inner sheathing of a vessel should also be freely opened, and wherever there is dead space it should be opened up so that there will be free circulation of the gas. Careful attention should be given to lifeboats, which are often infested with rats which resort to these places for water. Preferably, lifeboats should be cleaned and flooded by water prior to fumigation. Very close attention should be given to the poop deck, which is a space frequently containing a heterogeneous collection of litter and is generally badly rat infested. In general, the engine room

and fireroom do not harbor rats, but in the treatment of a vessel infested with plague-infected rats they should be fumigated. Be sure all personnel have been removed from the area to be fumigated or likely to be exposed to the fumes.

DISINFECTING PLANTS

The following-named quarantine stations of the United States Public Health Service are prepared to perform disinfection and fumigation when called upon. At some of the smaller stations a reasonable length of notice should be given in order that the fumigating materials may be procured. The fact that some of the stations are not provided with wharfage facilities is not an index to the capacity of the stations for performing disinfection:

| Station | Depth of water at dock, feet | Detention facilities (barracks), persons | Hospital beds |
|---|------------------------------|--|---------------|
| Astoria, Oreg. | | | |
| Baltimore, Md. ¹ | 8 | 100 | 12 |
| Boston, Mass. ¹ | 15 | 1, 400 | 65 |
| Brownsville, Tex. ¹ | | | |
| Wilmington, N. C. ² | | | |
| Charleston, S. C. ¹ | 22 | 80 | 5 |
| El Paso, Tex. ¹ | | | |
| Fort Monroe, Va. (Craney Island) ¹ | 10 | 1, 000 | 25 |
| Galveston, Tex. ¹ | 25 | 69 | 15 |
| Gulf, Miss. ² | 7 | 20 | 10 |
| Honolulu, T. H. ¹ | 18 | 1, 000 | 31 |
| Laredo, Tex. ¹ | | | |
| Los Angeles, Calif. | 35 | 6 | |
| Marcus Hook, Pa. (Reedy Island) ¹ | | | |
| Miami, Fla. | 18 | | |
| Mobile, Ala. | 35 | 65 | 15 |
| New Orleans, La. ¹ | 25 | 200 | 30 |
| New York, N. Y. | | | |
| Pensacola, Fla. ² | | | |
| Portland, Maine ² | | | |
| Port Townsend, Wash. ¹ | 12 | 200 | 25 |
| Reedy Island, Del. ¹ | 6 | 200 | 15 |
| Sabine Pass, Tex. ¹ | 30 | | 40 |
| San Diego, Calif. ^{1, 2} | 22 | 80 | 18 |
| San Francisco, Calif. ¹ | 19 | 600 | 10 |
| San Juan, P. R. ¹ | 12 | 75 | 8 |
| Savannah, Ga. ² | | | |
| Substations: ² | | | |
| Beverly, Mass. | | | |
| Lynn, Mass. | | | |
| Perth Amboy, N. J. | | | |
| Salem, Mass. | | | |
| San Ysidro, Calif. | | | |
| Tampa Bay, Fla. | 12 | 30 | 10 |

¹ Stations having disinfecting plants.

² Stations having fumigating service obtainable from other principal stations.

GLOSSARY

- ABDOMEN.**—That part of the body which lies below the chest as far as the pelvis and contains stomach, liver, intestine, etc.; the belly.
- ALBUMINOUS.**—Containing albumin or protein: e. g., meat, egg, milk, etc., and certain materials in bodies of plants and animals.
- ANALGESIC.**—A medicine that relieves pain.
- ANESTHETIC.**—A medicine used to produce local or general insensibility.
- ANODYNE.**—A medicine that soothes irritated nerves.
- ANTACID.**—A medicine correcting or neutralizing acidity.
- ANTIDOTE.**—A medicine given to counteract some action in another, or to neutralize the effect of a poison.
- ANTIMALARIAL.**—Curing or preventing malaria.
- ANTIPIRETIC.**—A remedy for fever.
- ANTIRHEUMATIC.**—Relieving or preventing rheumatism.
- ANTISEPTIC.**—A substance which prevents or retards the growth of organisms, especially of the septic variety, thus hindering putrefaction.
- ANTISPASMODIC.**—An agent that relieves nervous irritability and minor spasms.
- ASPHYXIA.**—Suspension of respiration and animation; suffocation, as in drowning or from breathing poisonous gases.
- ASTRINGENT.**—An agent that arrests bodily discharges by shrinking mucus membranes.
- AUTOCLAVE.**—An apparatus for sterilization by steam under pressure.
- BACILLUS.**—A rod-shaped microorganism.
- BACTERIA.**—Microscopic vegetable organisms of many varieties, some of which produce disease.
- BILL OF HEALTH.**—A document which must be obtained by the master of a vessel from a consul before his vessel may sail; a health clearance.
- BLEB.**—A blister.
- BUBONIC.**—Relating in any way to a bubo. Bubonic plague, the most common form of the plague, characterized by the occurrence of buboes in the groin or armpit.
- CAPILLARIES.**—The smallest blood vessels of the body which connect the veins and arteries.
- CARRIER.**—A person who harbors in his body disease-producing germs without actually suffering from or showing symptoms of the disease.
- CATHARTIC.**—An agent causing active movements of the bowels.
- CATHETER.**—A slender tubular instrument, generally of soft rubber or of silver, used chiefly for passing through urethra into bladder to draw off the urine.
- CAUTERIZE.**—To burn or scar with caustics or a hot iron.
- CHOLAGOGUE.**—Causing increased evacuation of bile.
- CLEANING.**—Removal by scrubbing and washing of material contaminated by disease-producing germs.
- CLINICAL.**—Relating to the course of a disease. Clinical thermometer, a self-registering thermometer for taking the bodily temperature.

COMMUNICABLE.—As of disease, capable of being passed from one individual to another. Commonly referred to as “contagious,” if readily communicable, as by the air; “infectious,” if not readily communicable, as by contact, water, food, etc.

CONTACT.—Any person or animal who has been sufficiently close to an infected individual to contract the disease.

CONTAGION.—The communication of disease from person to person by contact, direct or indirect.

CORYZA.—Acute rhinitis; cold in the head.

DEJECTA.—The matter passed from the bowel: feces.

DELIRIUM.—A temporary mental derangement, occurring in fevers, etc., characterized by incoherent and wandering talk, illusions, etc.

DELOUSING.—The killing of lice or their eggs on the person or clothing of an individual.

DEODORANT.—A substance which destroys or hides foul odors.

DIAPHORETIC.—A medicine that increases perspiration.

DISINFECTANT.—A substance used to destroy the germs of infectious and contagious diseases.

DISINFECTION.—The act or process of disinfecting; purification from infecting matter.

DISLOCATION.—Where the bones forming a joint do not occupy their usual relation to each other.

EMETIC.—An agent which causes vomiting.

ENDEMIC.—A disease constantly present in a community, as distinguished from epidemic.

ENEMA.—A fluid injected into the rectum for the purpose of clearing out the bowel, or of administering drugs or food.

EPIDEMIC.—The extensive prevalence in a community of a disease brought from without, or a temporary increase in number of cases of an endemic disease.

EPIDIDYMITIS.—Inflammation of the seminal ducts of the testicle.

ERUPTION.—A breaking out, especially the appearance of changes in the skin; a rash.

EXPECTORANT.—A medicine that promotes expectoration.

FEBRIFUGE.—Medicine which lessens fever.

FECES.—The matter discharged from the bowels during defecation.

FOUNTAIN SYRINGE.—One which has no pistons, but is hung up and acts by gravity.

FRACTURE.—A break, usually of a bone.

FUMIGATION.—The destruction of germs, insects, and rodents by means of chemical gases and fumes, as that of formaldehyde and sulfur.

FUNGUS.—A cellular vegetable organism of low order, feeding on organic matter; such as mushrooms, toadstools, yeasts, and molds.

GERM.—A microbe or pathogenic bacillus.

GERMICIDE.—An agent which is destructive to germs and microbes.

HEMOSTATIC.—An agent which stops the flow of blood, especially internal.

HERNIA.—Rupture. The protrusion of tissue through an abnormal opening. Most common is “inguinal,” the protrusion of a loop of gut through an opening in the belly wall at the groin.

HYPNOTIC.—A drug that induces sleep.

IMMOBILIZATION.—The act of rendering a part immovable or of preventing all possibility of movement in a part; especially applied to fractured bones.

- IMMUNITY.**—Security against any particular disease; “active,” when resulting from an attack of the disease, or from “vaccination”; “passive,” when produced by injection of serum of an immunized animal. The former is prolonged, the latter temporary.
- INCUBATION PERIOD.**—The period between exposure of an individual to and the onset of symptoms of a communicable disease.
- INFECTION.**—Communication of disease, as by entrance of pathogenic germs into an organism in any manner.
- INSECTICIDE.**—An agent which kills insects.
- ISOLATION.**—Limitation of the movement of known sick or “carrier” individuals or animals.
- LAXATIVE.**—A remedy which assists the movement of the bowels which move sluggishly. A laxative is useless where the bowels have been clogged for several days, in which case a cathartic is necessary.
- LIGATURE.**—A thread for tying a blood vessel.
- MACERATION.**—Softening by the action of a liquid.
- MACULE.**—A discolored spot on the skin not elevated above the surface.
- METABOLISM.**—Tissue change; consists of “anabolism” (building up), and “catabolism” (breaking down of tissues). It is the process of nourishing the tissue cells, and their production of heat and energy.
- MICROBE.**—A microscopic organism, especially a bacterium.
- MICROORGANISM.**—A microscopic living organism of the animal or vegetable kingdom; bacillus, bacterium, microbe, germ.
- ORCHITIS.**—Inflammation of the testicle; a common complication of mumps.
- ORGANIC.**—Having an organized structure, or a substance derived from living organisms.
- PALPITATION.**—Rapid and perceptible beating of the heart, which may be regular or irregular.
- PARASITICIDE.**—A chemical agent which destroys the various animal and vegetable parasites.
- PATHOGENIC.**—Productive of disease.
- PLEURA.**—A thin membrane which lines the inside of the chest wall and covers the lungs.
- PNEUMONIC.**—Relating to pneumonia. Pneumonic plague, a particularly fatal form of plague, with marked lung involvement.
- PRATIQUE.**—A license or permission granted by the authorities of a port to the master of a vessel, especially after sanitary inspection or quarantine, to hold communication with the shore.
- PROPHYLAXIS.**—The prevention of disease.
- PROTOZOA.**—The lowest division of the animal kingdom, including the unicellular organisms, such as the malarial parasite.
- PURGATIVE, PURGE.**—A medicine that moves the bowels actively.
- PURULENT.**—Consisting of pus, or matter.
- PUS.**—The matter from a sore or abscess.
- PUSTULE.**—A small circumscribed inflamed elevation on the skin, containing pus.
- QUARANTINE.**—Limitation of movements of persons exposed to communicable disease, or of those who have been in contact with persons ill with such disease.
- RABIES.**—A disease affecting certain animals, especially dogs, from which hydrophobia is communicated to man.
- RASH.**—An eruption on the skin.

RECTUM.—The lowest part of the large intestine, opening at the anus.

RENOVATION.—Rendering a space or room sanitary, in addition to cleaning, as by painting.

RHINITIS.—Inflammation of the mucus membrane of the nose.

SANITATION.—Employment of measures designed to promote health and prevent disease through proper care of surroundings and things.

SEDATIVE.—A medicine which allays irritation and quiets the nerves.

SEPTIC.—Produced by or due to putrefaction.

SHOCK.—A condition of collapse or profound prostration sometimes following hemorrhage, injury, anesthetic, and operation.

SOPORIFIC.—A hypnotic.

SPATULA.—A broad-bladed instrument like a knife with blunt edges for spreading ointments.

SPECIFIC.—A medicine which has a direct curative influence on a particular disease; as quinine in malaria.

STAPHYLOCOCCUS.—A bead-shaped microorganism occurring in clumps.

STERILE.—Free from pathogenic bacteria or other microorganisms; aseptic.

STIMULANT.—A medicine having power to excite organic action or to increase the vital activity of an organ, as heart stimulant, respiratory stimulant.

STREPTOCOCCUS.—A bead-shaped microorganism occurring in chains.

STRICTURE.—A narrowing of a passage or canal in the body due to disease or injury.

STYPTIC.—Medicine or application to control external hemorrhage.

SUSCEPTIBLE.—A person or animal who is not immune to a specific disease.

SUTURE.—A stitch used to draw together the edges of a wound.

TONIC.—An agent which tends to restore normal tone to the body.

TOURNIQUET.—An instrument for stopping the flow of blood through an artery by means of strong compression.

TOXIN.—A poisonous substance of undetermined chemical nature, elaborated during the growth of pathogenic microorganisms.

URETHRA.—The canal by which the urine is conducted from the bladder and discharged.

URINATION.—The act of discharging the contents of the bladder.

UVULA.—The small, fleshy body which hangs from the soft palate over the root of the tongue.

VARICOSE.—Having an unnatural enlargement or dilation, knotty and irregular in shape, as often seen in the veins of the lower extremities.

VENEREAL.—Pertaining to sexual intercourse or caused by it.

VERMICIDE.—A medicine which causes the death and expulsion of intestinal worms.

VIRUS, FILTRABLE.—The causative agent of some diseases, differentiated from other agents such as bacteria, protozoa, or molds; is ultramicroscopic, and passes through the finest filters. The cause of smallpox, yellow fever, and many other diseases.

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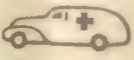



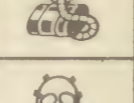

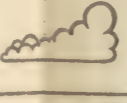

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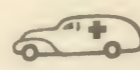
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CHEMICAL WARFARE AGENTS

| SYMBOL | NAME | CLASS | ODOR | TACTICAL CLASS | PHYSIOLOGICAL EFFECT | PROTECTION | FIRST AID | COLOR AND STATE | | PERSISTENCE | TACTICAL USES | FIELD NEUTRALIZATION |
|--------------|--|---------------|--|---|--|---|---|------------------------------|----------------------------------|--|---|--|
| | | | | | | | | Loaded | Released | | | |
| HS | MUSTARD. Di-Chlorodiethylsulfide. | Gas. | Garlic. Horseradish. Mustard. |  | Burns skin or membrane. |  | Remove clothing. Wash affected parts of body with soapy water. Do not bandage eye injuries. | Heavy, dark, oily liquid. | Liquid slowly evaporates. | Open, 1 day. Woods, 1 week to all winter. | To neutralize areas. Counter-battery. Attack on Personnel. | Cover with bleaching powder and earth 3% sol. of Na ₂ S. |
| M-1 | LEWISITE. Chlorovinylchlorarsine. | Gas. | Geraniums. |  | Irritates nasal passages. Later skin burns; poison. |  | Apply 2% to 5% sol. hydrogen peroxide to skin; wash with soap and water. Wash eyes with 1/2% to 1% sol. of hydrogen peroxide. | Heavy, dark, oily liquid. | Liquid slowly evaporates. | Open, 1 day. Woods, 1 week. | Similar to Mustard. | Wash down with water. Cover with earth. Alcohol. NaOH spray. |
| ED | ETHYLDI-CHLORARSINE. | Gas. | Biting. Stinging. |  | Causes blisters; sores. |  | Same as for Lewisite. | Clear, oily liquid. | Evaporates at medium rate. | 1 hour. | Counter-battery. Preparation fire. Harassing fire. | Cover with earth, caustic NaOH solution. |
| PS | CHLORPICRIN. Nitrochloroform. | Gas. | Fly paper. Anise. |  | Causes severe coughing, crying; lung edema. |  | Wash eyes, keep quiet and warm. Do not rub eyes. | Yellow, oily liquid. | Evaporates like water. | Open, 6 hours. Woods, 12 hours. | Harassing fire. | Na ₂ SO ₃ —Sodium Sulfite in alcohol solution. |
| DP | DIPHOSGENE. Trichlormethyl | Gas. | Ensilage. Musty hay. |  | Causes coughing, breathing hurts; |  | Keep quiet and warm. Give coffee as a stimulant. | Colorless liquid. | Evaporates like water. | 30 minutes. | Harassing fire. | Alkali. |
| CG | PHOSGENE. Carbonyl Chloride. | Gas. | Musty hay. Green corn. Ensilage. |  | Irritates lungs. |  | Keep quiet and warm. Give coffee as a stimulant. | Colorless liquid. | Colorless gas. | 10 to 30 minutes. | Surprise attacks; projectiles. Gas cloud release. For quick physical effect. | Alkali. |
| CL | CHLORINE. | Gas. | Highly pungent. |  | Intense immediate choking. |  | Remove from gassed area. Keep quiet and warm. Coffee as stimulant. | Yellow liquid. | Yellow-green gas. | 10 minutes. | Surprise attacks (cloud). | Alkaline solution. |
| CN *(CNS) | CHLORACETO-PHENONE. | Gas Solution. | Apple blossoms. |  | Makes eyes smart, shut tightly, tears flow. Temporary. |  | Wash eyes with water or boric acid. Do not rub or bandage. Wash skin with Na ₂ SO ₃ , 4% sol. in 50% alcohol. | Brown crystalline powder. | Cloud of small, solid particles. | 10 minutes. | Training. Mob control. CNS used in counter-battery to force mask wear. | Strong, hot solution of Sodium carbonate. |
| CA | BROMBENZYL-CYANIDE. | Gas. | Sour fruit. |  | Eyes smart, shut, tears flow. Effect lasts some time. |  | Wash eyes with boric acid. Do not bandage. Breathe small amounts of Chlorine. | Dark brown, oily liquid. | Slowly evaporates. | Several days (weeks in winter). | To neutralize areas. Counter-battery. | Alcoholic Sodium hydroxide spray. |
| DM | ADAMSITE. Diphenylamine Chlorarsine. | Gas. | Coal smoke. |  | Causes sneezing, sick, depressed feeling. |  | Remove to pure air and keep warm and quiet. | Yellow-green granular solid. | Yellow smoke. | 10 minutes. | Gas cloud attacks. Mob control. | Bleaching powder solution. |
| DA | DIPHENYL-CHLORARSINE. | Gas. | Shoe polish. |  | Causes sneezing, sick, depressed feeling. |  | Remove to pure air; keep quiet. Sniff chlorine from bleaching powder bottle. | White crystalline solid. | Vapor or fine smoke. | Summer, 10 minutes. | Harassing fire. | Bleaching powder solution. |
| HC | HC MIXTURE. | Smoke. | Sharp-acrid. |  | Harmless. | None needed. | Produces no effect requiring treatment. | Gray solid. | White to gray smoke. | While burning. | To screen small operations in own lines and for training purposes. | None needed. |
| FS | SULPHUR TRIOXIDE. In Chlorsulfonic Acid. | Smoke. | Burning matches. |  | Liquid burns skin if allowed to remain. |  | Wash with soda solution. | Clear to brown liquid. | Dense white smoke. | 5 to 10 minutes. | Airplane spray for screen on broad front. | Alkaline solution. |
| FM | TITANIUM TETRACHLORIDE. | Smoke. | Acrid. |  | Harmless. | None needed. | Produces no effect requiring treatment. | Yellowish to brown liquid. | White smoke. | 10 minutes. | Screening operations. | None needed. |
| WP | WHITE PHOSPHORUS. | Smoke. | Burning matches. |  | Burning pieces adhere to skin, clothing. | None available. | Immerse in water or wet with CuSO ₄ , 2% solution. | Pale yellow solid. | Burns to white smoke in air. | 10 minutes. | To screen advancing troops. Cause incendiary effects, losses. Harass enemy observers. | Burns out. |
| †TH | THERMIT (Thermite). Magnetic Iron Oxide and Aluminum Powder. | Incendiary. | Odorless. |  | 5,000 degrees F. heat ignites materials. | Cover with earth, sand. | Treat for burn. | Metallic powder. | White-hot metal. | 5 minutes. | Destruction of materiel. | Quickly cover with earth or sand. |

*CNS, a solution of CN in Chloroform and Chlorpicrin, frequently used for shell filling.
†The filling of a Magnesium bomb which serves to ignite the metal magnesium casing.



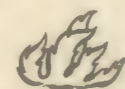
Hospital
casualty
agent.



Field
casualty
agent.



Smoke
screen.



Incendiary
agent.



Gas
mask.



Gasproof
clothing.

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